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October 11–14, 2017
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Frontiers in Medical Devices Conference
Innovations in Modeling and Simulation: Advancing Regulatory Science
May 16–18, 2017, Washington DC
The College Park Marriott Hotel and Conference Center at the University of Maryland

The Biomedical Engineering Society and the US Food and Drug Administration have formed a partnership to co-host the BMES/FDA Frontiers in Medical Devices Conference, a meeting for researchers, engineers, clinicians and other professionals in the fields of designing, building and using medical devices.

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Research Scientist, Center for Devices and Radiological Health, US FDA
Leonardo.Angelone@fda.hhs.gov

Anita Bestelmeyer
Director, Corporate Computer-Aided Engineering, BD
anita.bestelmeyer@bd.com

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Senior Principal Engineer, Cardiac Rhythm and Heart Failure, Medtronic
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Melissa L. Knothe Tate, Ph.D.
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Early registration opens
February 23, 2017

Early registration deadline
April 11, 2017

For more information visit:
www.bmes.org/meddeviceconference
WELCOME TO THE 2016 ANNUAL MEETING of the Biomedical Engineering Society! The Biomedical Engineering Society’s Annual Meeting is the premier event for the Society and the field of biomedical engineering. Every fall it is the place to be to share and learn about cutting-edge research in all the disciplines of BME.

This year’s theme—“Transforming Discovery into Health Technology”—perfectly describes the work we do every day in our labs. It is a description we are striving to share with the public as the Society heads towards its 50th Anniversary in 2018. Bringing medicine and engineering together will be central to solving many of the health challenges humankind faces; and as a member of BMES you will play a vital role in that effort.

It is no coincidence that this year’s meeting is being held in Minneapolis, a major hub of medical device innovation. BMES seeks to go beyond being the essential annual meeting for academics; we have set our sights on becoming the networking place-to-be for academics and industry in the biomedical engineering field.

One of those local innovators, Medtronic Chairman and CEO Omar Ishrak, will deliver a keynote address Thursday morning. Medtronic is a leading medical technology company, with more than $27 billion in annual revenue, and operations reaching more than 155 countries worldwide. The company offers technologies, solutions and therapies to treat a wide range of medical conditions, including cardiac and vascular diseases, respiratory, neurological and spinal conditions, diabetes, and more. Medtronic’s mission to alleviate pain, restore health, and extend life for millions of people around the world is perfectly in line with the goals of BMES.

Medtronic, along with St. Jude Medical, Boston Scientific and Smiths Medical, are holding tours of their facilities during the meeting. The tours are another example of the synergy being built between BMES and industry. Another step towards that goal is the Society’s new corporate memberships. The initial corporate members are Boston Scientific, Harris Skeele Corporation, Medtronic, St. Jude Medical and Smiths Medical. Many other organizations are in talks to join the Society as corporate members. This new program will surely make the Society stronger and benefit all its members.

Student and Early Career programming has been expanded for the 2016 meeting. The programming is specifically tailored for those navigating new careers. Topics include: BME Careers in Academia, BME Careers in Industry, BME Government and Alternative Careers, and Rapid Resume Reviews.

This is also the first year BMES will offer the Career Zone, scheduled for Thursday, October 6th and Friday, October 7th in the Exhibit Hall.

This new alternative to the career fair will bring together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market.

The terrific slate of keynote addresses starts Thursday morning with Omar Ishrak’s talk. Later that day, Nicholas Peppas will deliver the Pritzker Distinguished Lecture and on Saturday Jennifer Munson and Srinivas Sridhar will present the Rita Schaffer Young Investigator and Diversity lecturers, respectively.

Special thanks are due to Conference Chair Song Li, Vice Chair David Odde and Program Chair Cynthia A. Reinhart-King, BMES Staff, NSF, NIH, our sponsors and our meeting attendees. My very best wishes to you for an enjoyable and productive meeting!
Letter from the Chairs

Song Li, PhD
Annual Meeting Chair
Chancellor Professor
Chair, Department of Bioengineering
Professor, Department of Medicine
University of California, Los Angeles
Los Angeles, CA

Cynthia Reinhart-King, PhD
Annual Meeting Program Chair
Associate Professor
Biomedical Engineering
Cornell University
Ithaca, NY

David Odde, PhD
Annual Meeting Vice Chair
Professor, Department of
Biomedical Engineering
University of Minnesota
Minneapolis, MN
It is a great pleasure to welcome all of you to the 2016 BMES meeting in Minneapolis, Minnesota. Minneapolis is a hub of the medical device industry and a city full of innovation and inspiration. It is the perfect place to hold this BMES meeting with a theme of “Transforming Discovery into Health Technology”.

The four day meeting program will encompass five exciting plenary sessions, 19 scientific tracks and numerous workshops and symposia. The scientific program will highlight the most recent advancements in the broad field of bioengineering and promote creativity and collaboration. This year’s expanding industry program reflects the theme of this meeting and the further development of partnership between academia and industry in the BMES community. The meeting will be kicked off by on-site tours at local medical device companies. You will hear from the leaders of Medtronic and The Gates Foundation in plenary sessions. There will be 8 sessions in industry programs that cover a variety of topics including Small Business Innovation Research (SBIR), Technology Transfer (STTR), and Venture Capital Pitches.

There will be 12 special sessions on career development and education. For example, the BMES-NSF Special Session on Research in Biomedical Engineering and Grant Writing will showcase NSF-funded research and researchers, foster collaboration and idea exchange, familiarize participants with NSF funding mechanisms, and provide strategies for preparing competitive grant proposals. A session on Educational Approaches to Best Prepare Students for Industry will focus on educational approaches to best prepare biomedical engineering students at both the undergraduate and graduate levels for a professional career in industry.

There will be many sessions that showcase the outreach activities at BMES. The Meet the Expert sessions will feature 5 specialized sessions covering topics that range from tips to applying for funding from program directors, reviewers, and funded investigators to a session featuring journal editors who will discuss how to navigate choosing a journal and judging impact. There are also sessions on the increasingly important topics of data-sharing, building international collaborations and creating connections with industry. Each of the Meet the Experts sessions will be a terrific opportunity to ask questions and network with leaders in the field.

The International Forum on Biomedical Engineering will bring together leaders of biomedical engineering from several countries to share global perspective of this field and forge international collaborations. The joint symposium with American Association of Anatomists will showcase the biological and engineering approaches in technology development and applications with a focus on the rapidly growing role of CRISPR/Cas9 and microRNA technologies in bioengineering.

This year we have record-breaking numbers of abstracts (2,675) and exhibitors (114). Posters and exhibitors will light up the exhibit hall. Discussions at the poster sessions will facilitate the in-depth interactions of the participants, and there will be numerous poster awards to recognize the excellent work by the poster presenters.

We would like to thank all of the track chairs, abstract reviewers and session chairs who have helped organize this meeting and shape the program. We thank all of the participants for attending this meeting and contributing your expertise to the program.

Special thanks to the industry committee, especially Ben Noe and Walt Baxter. We thank the support of BMES leadership and BMES administration, and the hard work by BMES Executive Director Edward Schilling, Meeting Director Debby Tucker, Education Director Michele Ciapa and Communications Director Doug Beizer. We also thank John White and the National Meetings Committee for guidance and support.

We look forward to meeting you at this exciting and inspiring BMES meeting!
Omar Ishrak has served as Chairman and Chief Executive Officer of Medtronic since June 2011. Medtronic is the world’s leading medical technology company, with more than $27 billion in annual revenue, and operations reaching more than 160 countries worldwide. Medtronic offers technologies, solutions and therapies to treat a wide range of medical conditions, including cardiac and vascular diseases, respiratory, neurological and spinal conditions, diabetes, and more. The Medtronic Mission is to alleviate pain, restore health, and extend life for millions of people around the world.

Since joining Medtronic, Omar has focused the company on three core strategies of Therapy Innovation, Economic Value and Globalization. These three strategies form the basis for Medtronic’s efforts to partner with its customers to drive high quality patient outcomes, expand patient access to healthcare, and lower costs in health care systems around the world. In 2014, Omar engineered the acquisition of Covidien, a $10 billion global manufacturer of surgical products and supplies. The acquisition of Covidien was the largest medical technology acquisition in the history of the industry.

Earlier in his career, Omar amassed 13 years of technology development and business management experience, holding leadership positions at Diasonics/Vingmed, and various product development and engineering positions at Philips Ultrasound.

He grew up in Bangladesh, earned a Bachelor of Science Degree and Ph.D. in Electrical Engineering from the University of London, King’s College.

Omar currently serves as co-chair of the World Economic Forum’s Health and Healthcare Community, which includes global leaders focused on shaping the future of health and healthcare. Key areas of focus for this community include promoting healthy behaviors, better management of future pandemics/epidemics, increasing global access to care, and increasing value in healthcare systems to advance healthcare delivery and improve patient outcomes.

Omar is a member of the Board of Trustees of the Asia Society, the leading educational organization dedicated to promoting mutual understanding and strengthening partnerships among peoples, leaders and institutions of Asia and the United States in a global context. He is also a member of the Minnesota Public Radio Board of Trustees.

The Wallace H. Coulter Award for Healthcare Innovation recognizes an outstanding individual who has demonstrated a lifetime commitment to and made important contributions to patient healthcare.
The field of biomaterials has become an integral part of biomedical engineering as it provides the foundations for the investigation and development of novel nano-and microstructures for organ replacement, carriers, targeting agents, biodegradable scaffolds, cognitive and physiologically-responsive systems, diagnostic devices, biosensors and combination products. Examining the great medical successes of the last 25 years we conclude that the existence of advanced biomaterials has allowed us to treat patients, improve their quality of life and develop new medical systems and devices that we could have not imagined 50 years ago. New design methods for intelligent biomaterials have allowed a wide range of biomedical applications. Indeed, engineering the molecular design of intelligent hydrogels by controlling recognition and specificity is the first step in coordinating and duplicating complex biological and physiological processes. We address design and synthesis characteristics of novel crosslinked networks capable of desirable biomaterial/protein interaction and protein release. We also discuss the dynamic behavior of artificial molecular structures capable of specific molecular recognition of biological molecules. We will also discuss recent studies on intelligent polymer carriers for protein delivery to specific sites, using responsive polymers to achieve pH- or temperature-triggered delivery, usually in modulated mode, and improvement of the behavior of their glyco- and cyto-adhesive behavior and cell recognition. Finally, intelligent cationic polymers have been investigated as biomaterials for drug delivery of nucleic acids because they can form polyelectrolyte complexes with negatively charged (anionic) nucleic acids, protecting the nucleic acid from degradation and enhancing cellular uptake and endosomal escape.

Nicholas A. Peppas is the Cockrell Family Regents Chaired Professor in the Departments of Biomedical and Chemical Engineering of the Cockrell School of Engineering, the Department of Surgery and Perioperative Care of the Dell Medical School, and the Division of Pharmaceutics of the College of Pharmacy. He is also the Director of the Institute of Biomaterials, Drug Delivery and Regenerative Medicine of the University of Texas at Austin. His work in biomaterials, biopolymer physics, protein and therapeutic agent delivery and bionanotechnology has made seminal contributions to the dynamic behavior of biomacromolecules in complex biological environments with emphasis on solute (drug/protein) transport through three-dimensional macromolecular networks. A leading authority in biomaterials and drug delivery principles, his research blends modern molecular and cellular biology with engineering to analyze complex biological structures and to generate next-generation systems with enhanced applicability, reliability, and functionality and to design the next-generation of medical systems and devices for patient treatment.
The conventional MRI/NMR acquisition framework has worked so well that it has remained nearly constant for almost 50 years. In this talk we will discuss a new framework, Magnetic Resonance Fingerprinting (MRF), that we believe has the potential to overcome previous limitations and open up numerous new possibilities for MR. Instead of using a single "purified" pulse sequence, MRF uses a pseudorandomized pulse sequence which is simultaneously sensitive to multiple tissue properties. This rich signal no longer fits into the standard MR processing framework. Because of this, MRF uses pattern recognition to decode the acquired data. Besides providing high quality quantitative results for multiple MR parameters simultaneously from a single acquisition, MRF also provides a high level of suppression of measurement errors and in certain cases may provide higher sensitivity than traditional MR methods. MRF is also able to directly generate maps specific to individual tissue types, which should allow for earlier disease detection. Finally, MRF should practically simplify the clinical MR workflow, with the potential that the end user could just be presented with a single "scan" button.

Mark Griswold, PhD, is a professor in the Department of Radiology at Case Western Reserve University and University Hospitals in Cleveland, Ohio, with secondary appointments in Biomedical Engineering, Physics, Electrical Engineering and Computer Science. Dr. Griswold received his BS in Electrical Engineering from the University of Illinois and his PhD in Physics from the University of Würzburg, Germany. Prior to joining Case Western Reserve, Dr. Griswold was director of the RF Coil Development Laboratory at Beth Israel Deaconess Medical Center/Harvard Medical School. He is a fellow of the American Institute of Medical and Biological Engineering (2012) and the International Society of Magnetic Resonance in Medicine (2009) and serves on the Board of Trustees of the International Society of Magnetic Resonance in Medicine (ISMRM).
Extraordinary Challenges and the Need for Extraordinary Competencies—The Role of the Biomedical Engineer

Here are some sobering statistics (cited from http://scienceforsociety.com/)

- Over 1 billion of the world’s population do not have access to electricity. Less than 10% of people have access to electricity in some countries.

- 660 million lack access to safe water. The water crisis is considered by many experts as the #1 global risk for impact on society.

- Almost a third of humanity (over 2 billion) lack access to adequate sanitation.

- Life expectancy globally varies from above 80 (in advanced nations) to below 50 (in some developing nations), due to inadequate access to health care.

- 16,000 children under the age of 5 die each day from preventable causes. 25% or more of children in 17 countries have never been to a primary school.

None of these have easy answers. Throughout the world, extraordinary challenges require extraordinary competencies. In this talk, I will describe what the Bill & Melinda Gates Foundation is doing in the area of global health, with a focus in my area of expertise – diagnostics. I’ll discuss some of the lessons we are learning, and how it affects our work with our partners, whom we entrust to find real-world solutions to complex systemic problems in global health. I’ll discuss the need for innovative engineers, with a special emphasis for pragmatic, interdisciplinary systems thinking. I’ll wrap up with: 1) the single greatest deterrent to addressing these challenges, and 2) some advice for future generations of biomedical engineers – those of you who might find yourselves one day called by these extraordinary challenges.

**Jim Gallarda** is currently a Senior Program Officer with the Bill & Melinda Gates Foundation in Seattle, WA. He has over 25 years of industry experience in commercial infectious disease assay development and has overseen multiple teams developing immunodiagnostic & PCR systems for HIV-1, HIV-2, HCV, HBV and WNV. He now serves as a diagnostic lead for the Foundation’s efforts in tuberculosis & most recently, the Ebola crisis.
glioblastoma is the deadliest form of brain cancer and is defined by the invasive nature of its cells. Invasion in the brain follows distinctive routes that correlate with interstitial and bulk flow pathways. In brain cancer, increased interstitial fluid flow develops due to heightened interstitial pressure in the tumor bulk interfacing with the relatively normal pressure of the surrounding brain tissue. This differential leads to fluid transport specifically through the invasive tissue edge of the tumor where cells are prone to both interact with the surrounding brain microenvironment and to evade localized, transport-limited therapies. To examine how interstitial fluid flow alters the invasion of brain cancer cells, we have developed a number of in vitro and in vivo methods to examine fluid flow and its effects on cellular responses. In vitro, we have found that interstitial flow can enhance invasion of brain cancer cells using cell lines and patient-derived glioma stem cells in tissue-engineered models of the brain-tumor interface. These effects are mediated simultaneously by both chemotactic and mechanotransduction mechanisms. In vivo, we have seen interstitial flow both correlate with and increase invasion of implanted cancer cells through the brain. By conducting in vivo measurements of interstitial flow using MRI techniques, we can correlate interstitial fluid flow to patterns of glial cell response, extracellular matrix deposition, and receptor activation in tumor-associated brain along these invasive pathways. These findings further implicate interstitial fluid flow as a driver of tissue morphology and indicate multiple mechanisms through which fluid flow can mediate cellular invasion in the brain.
Global Nanomedicine Academy: Broadening Participation and Diversity through Collaborative Education

The vision of the Nanomedicine Academy is to ensure access to specialized knowledge unconstrained by geography or economic status, provide access to training in knowledge and techniques in nanomedicine, and establish opportunities for collaboration across institutions in education and research, in order to train the future leaders in the emerging field of nanomedicine. Over the last several years the Nanomedicine Academy has established a new model of higher education that involves partnership and knowledge sharing between nodes of expertise in nanomedicine and Minority Serving Institutions (MSI). The Academy has created a scalable, interactive, reciprocal relationship among a large pool of minority students, and with leading experts in the field, established an evidence-based education program to attract and retain students from underrepresented minority populations. The initial partnering institutions are Northeastern University, University of Puerto Rico Mayaguez, Tuskegee University, Morgan State University, and Florida International University, as well as institutions in other countries. These unique programs have trained hundreds of graduate and undergraduate students in MSI, and led to institutional change in the form of new programs in nanomedicine.

Srinivas Sridhar, PhD
University Distinguished Professor of Physics, Biomedical Engineering and Chemical Engineering
Northeastern University
Boston, Massachusetts

Saturday, October 8, 2016
10:30 AM
Auditorium/Minneapolis Convention Center

Srinivas Sridhar, Ph.D. is University Distinguished Professor of Physics, Biomedical Engineering and Chemical Engineering at Northeastern University, and Lecturer on Radiation Oncology, Harvard Medical School.

An elected Fellow of the American Physical Society, Sridhar’s current areas of research are nanomedicine, neurotechnology and MRI imaging. His paper in Nature in 2003 was listed among Breakthroughs of 2003 by the journal Science.

As Founding Director of the Electronic Materials Research Institute at Northeastern University, Sridhar established a Nanomedicine Center for synthesis and characterization of nanoparticle formulations. Sridhar is passionately committed to training future scientists and engineers and providing access to knowledge to all particularly to those from under-represented minority communities. He has trained more than 120 faculty, postdoctoral fellows, scientists, and graduate and undergraduate students. He is Director of the Nanomedicine Academy funded by grants for NSF and NIH, whose vision is to providing training in nanomedicine nationally and globally. He is Director of CaNCURE: Cancer Nanomedicine Coops for Undergraduate Research, an NIH R25 program to provide research training in cancer nanomedicine. He is Director and PI of the NSF IGERT Nanomedicine Science and Technology Center. He developed several first-of-their kind courses in Nanomedicine. These unique programs have taught hundreds of graduate and undergraduate students in several minority serving institutions, and led to institutional change in the form of new programs in nanomedicine.
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Email: yuliwang@andrew.cmu.edu
Web: www.bme.cmu.edu

The Department of Biomedical Engineering at Carnegie Mellon is built upon a long tradition of interdisciplinary research across departmental borders. Its decades-old research program emphasizes a collaborative network that balances four synergistic areas: basic engineering principles of living cells and tissues, engineering tools for biomedical research, interface between living and artificial materials, and clinical applications of biomedical engineering. Training programs encourage students to expand their vision and prepare them for a wide range of careers from academic research in basic sciences, to engineering entrepreneurship, to medical care.

Booth # 401

Case Western Reserve University
10900 Euclid Avenue
Wickenden 310
Cleveland, OH 44106
Phone: 216-368-4094
Email: bmedept@case.edu
Web: http://bme.case.edu/

The Department of Biomedical Engineering at Case Western Reserve University offers distinctive programs ranging from the B.S. degree through the Ph.D. degree, including our innovative M.D./Ph.D. degree, M.D./M.S. degree, and our Biomedical Entrepreneurship program. Cutting-edge research thrusts include: biomaterials and tissue engineering, neural engineering and neuroprostheses, biomedical imaging and sensing, transport and metabolic engineering, biomechanics, and targeted therapeutics.
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Booth # 225

The City College of New York
Biomedical Engineering
160 Convent Avenue
New York, NY 10031
Phone: 212-650-6707
Email: pcupid@ccny.cuny.edu
Web: bme.ccny.cuny.edu

The City College of New York— the founding college of CUNY. Founded in 1847, it has produced nine Nobel Prize winners and ranks seventh in the number of alumni who have been elected to the National Academy of Sciences. The Biomedical Engineering Department was established in 2002. BME at CCNY: Biomaterials/nanotechnology; Cardiovascular Engineering; Musculoskeletal Biomechanics; and Neural Engineering.

Booth # 708

Clemson University
Department of Bioengineering
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Web: www.clemson.edu/ces/bioe

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Golden, CO 80401
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Email: djacobs@mines.edu
Web: www.chemeng.mines.edu

The Chemical & Biological Engineering Department at Colorado School of Mines is a dynamic, exciting environment for research and higher education. Research areas include renewable energy, soft materials, biomedical devices, and thin-film materials. Golden, Colorado is a gorgeous place to work and play with 300 days of sunshine a year.

Booths # 809 / 811

Columbia University
Department of Biomedical Engineering
351 Engineering Terrace
500 West 120th Street
New York, NY 10027
Phone: 212-854-4460
Email: bme@columbia.edu
Web: www.bme.columbia.edu

The Department of Biomedical Engineering at Columbia University offers biomedical engineering education and research through B.S., M.S., Ph.D., and M.D./Ph.D. degree programs. Our department provides a surprising mix of the intellectual atmosphere of an Ivy League institution and the sense of community of a small college enriched by the diversity of New York City.

Booths # 500/502

Cornell University
101 Weill Hall
Ithaca, NY 14853
Phone: 607-255-2573
Email: bh42@cornell.edu
Web: www.bme.cornell.edu

The Meinig School of Biomedical Engineering at Cornell University focuses on interdisciplinary research to achieve a quantitative understanding of human biology at all spatial and temporal scales with the goal of improving human health. The school has a close relationship with Weill Cornell Medical College and its associated hospitals in New York City, including an “Immersion Term” during which all Ph.D. students spend 7 weeks in a clinical experience at the Medical College. Cornell University is a comprehensive university with outstanding programs of teaching and research in all areas of human inquiry which has its main campus at Ithaca in the Finger Lakes Region of upstate New York. The Meinig School has close collaborations with other departments on campus.
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Email: biomed@drexel.edu
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The School of Biomedical Engineering, Science and Health Systems is a nationally recognized center of research and education. Areas of specialization include biomechanics, human performance, biomaterials, tissue engineering, biomedical imaging, bioinformatics and drug delivery. Multidisciplinary research is carried out through collaborations with clinical institutions in the Philadelphia area.

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Email: smanjarr@fiu.edu
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**Booth # 825**
**George Mason University**
**Department of Bioengineering**
4400 University Drive, MS 165
Fairfax, VA 22030
Phone: 703-993-4190
Email: tmcgowa2@gmu.edu
Web: www.bioengineering.gmu.edu

Located in the Washington DC metropolitan area, George Mason University’s Department of Bioengineering offers unique research and educational experience with collaborative opportunities with nearby national laboratories, institutes, and clinical facilities. The BS program earned accreditation from ABET in 2012 and offers three concentrations: Biomedical Signals & Systems, Bioengineering Healthcare Informatics, and Bioengineering Pre-health. The Bioengineering PhD program is currently accepting applications from outstanding prospective students with full tuition and stipend support. The department has 11 primary faculty members with approximately $6M of active research in areas ranging from biomedical imaging, nanotechnology, neural engineering, and date-driven biomechanics.

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Booth # 614
The Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech/Emory University
313 Ferst Drive
Atlanta, GA 30332
Phone: 404-385-0124
Email: gradstudies@bme.gatech.edu
Web: www.bme.gatech.edu

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Imperial College London
Department of Bioengineering
Royal School of Mines
Prince Conson Road
London SW72RP UK
Phone: +44 (0) 20 7594 5179
Email: bioengineering@imperial.ac.uk
Web: imperial.ac.uk/bioengineering

Imperial College London is consistently rated in the top 10 universities worldwide. The Department of Bioengineering at Imperial is the leading Department in the UK. Our research spans the breadth of bioengineering. We offer a range of academic and research opportunities for undergraduate (MEng) and postgraduate (MSc, MRes and PhD).

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Department of Biomedical Engineering
720 Rutland Avenue, Trayor 406
Baltimore, MD 21205
Phone: 410-614-4280
Email: hlane1@jhu.edu
Web: www.bme.jhu.edu

Faculty and students in the Department of Biomedical Engineering have been breaking new ground in biomedical research for over 50 years, and we strive to continue this history of innovation and discovery every day. Ph.D. Program – an intellectually stimulating environment and the nurturing spirit of collegiality extend throughout the program which is consistently ranked #1 in the US. Research areas include biomedical imaging; cell and tissue engineering; computational biology; computational medicine; molecular and cellular systems biology; and systems neuroscience and neuroengineering. MSE Program – prepares students to pursue careers in research and development, or as a step toward PhD or MD/PhD education. CBID MSE Program – an intensive twelve-month program that focuses on development and commercialization of medical devices. Applied Biomedical Engineering MS Program – provides practicing engineers and scientists the opportunity to enhance their skills in engineering so that they can solve today’s most critical problems in biology and medicine.

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Marquette University Medical College of Wisconsin
P.O. Box 1881
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Phone: 414-288-6059
Email: jay.goldberg@mu.edu
Web: www.mu.edu

The Marquette University and Medical College of Wisconsin Department of Biomedical Engineering features innovative programs in the following research areas: cardiovascular and pulmonary; imaging; medical device innovation; analytics, informatics and software engineering; computational biology and systems biology; molecular systems and modeling; orthopaedics and orthopaedic rehabilitation; neurosystems and neurorehabilitation.

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Mayo Graduate School Biomedical Engineering & Physiology Program
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Rochester, MN 55905
Phone: 507-255-8544
Email: kingsleyberg.shirley@mayo.edu
Web: www.mayo.edu/gs/programs/phd/biomedical-engineering

The Graduate Program in Biomedical Engineering & Physiology at Mayo Graduate School has a long, rich history with a tradition of research that spans interdisciplinary boundaries and routinely connects the engineering and physical sciences to the biological sciences and clinical practice. The Mayo Graduate School offers graduate programs in various fields leading to PhD and MD/PhD degrees. The Graduate Program in Biomedical Engineering & Physiology offers a wide range of research opportunities from basic discovery science to clinical and translational research. Students are provided the necessary quantitative tools to become leaders in diverse fields of biomedical sciences.

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McGill University
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Michigan State University Department of Biomedical Engineering
428 S. Lane, Room 3410 Engineering Building
East Lansing, MI 48824
Phone: 517-884-7931
Email: minottni@egr.msu.edu
Web: www.egr.msu.edu/home

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1400 Townsend Drive
Houghton, MI 49931
Phone: 906-487-2772
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Located in the beautiful Upper Peninsula of Michigan, the Department of Biomedical Engineering at Michigan Technological University conducts world-class research at the interface of medicine, biology, and engineering, while educating the next generation of biomedical engineers by offering B.S., M.S., and Ph.D. degrees. The BME Department at MTU leverages the University’s strong and rich history of engineering education and research. We create the future of medicine.

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National Institute of Biomedical Imaging and Bioengineering/
National Institutes of Health
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Phone:  848-445-4500
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Stevens Institute of Technology is a top-tier teaching and research institution with graduate programs that lead to an MBE, PhD, or a joint MD/PhD with Weill Cornell Medical College. Situated in Hoboken, New Jersey, we offer education and research opportunities in biomaterials, drug delivery, biomedical imaging, bioelectronics, tissue engineering, and biomechanics.

Biomedical Engineering Letters (BMEL) is an international peer reviewed journal presenting original scientific advances and technological developments across all fields of biomedical research including clinical applications of the new development.
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Temple University
College of Engineering, Department of Bioengineering
1947 North 12th Street
Philadelphia, PA  19122
Phone:  215-204-3404
Email:  doreen.aiello@temple.edu
Web:  http://engineering.temple.edu/bioengineering

Texas A & M University
Department of Biomedical Engineering
3120 TAMU
College Station, TX 77843
Phone:  979-845-5532
Email:  bmen@tamu.edu
Web:  http://engineering.tamu.edu/biomedical
The Department of Biomedical Engineering at Texas A&M University offers allows students to impact health outcomes in the areas of sensing and imaging, optics, orthopedic biomechanics, biomaterials, tissue engineering, biomolecular and cellular engineering, and more. The department's award-winning faculty have strong collaborations with medical and veterinary schools as well as industry. Offering graduate degrees at the master's and doctoral levels, this program provides an exceptional academic experience.

Tufts University
Biomedical Engineering
4 Colby Street
Medford, MA  02155
Phone:  614-627-2580
Email:  bme@tufts.edu
Web:  www.engineering.tufts.edu/bme
Biomedical Engineering at Tufts University draws from core disciplines such as engineering, biology, computer science, physics, chemistry, and physiology emphasizing an interdisciplinary approach to research and education. Strong emphasis is placed on interactions with faculty in Arts and Sciences and the professional schools. The Tissue Engineering Resource Center (TERC) was initiated in August of 2004 as a Resource Center supported through the National Institutes of Health P41 program. The core themes in the Center focus on functional tissue engineering achieved through a systems approach—integrating cells, scaffolds and bioreactors to control the environment in vitro for translation in vivo.

Tulane University
Department of Biomedical Engineering
500 Lindy Boggs Bldg.
New Orleans, LA  70118
Phone:  504-865-5897
Email:  csteward3@tulane.edu
Web:  www.bmen.tulane.edu
Tulane’s Biomedical Engineering Department is located in the diverse cultural mecca of New Orleans and has been established since 1977. Degrees offered range from B.S. to Ph.D., and research includes biomechanics, biotransport, regenerative medicine, biomaterials and devices. Collaboration with the School of Medicine and numerous other centers are available and abounding.

The University of Akron
Department of Biomedical Engineering
302 Buchtel Common
Akron, OH  44325-0302
Phone:  330-972-6650
Email:  bmegrad@uakron.edu
Web:  http://bme.uakron.edu
The University of Akron offers MS and PhD degree programs in BME. These programs have an individualized curricular approach, designed in coordination with each student’s career plans. BME faculty are engaged in both basic and translational research areas, including, but not limited to, optics, microtechnology, biomaterials, biomechanics, and regenerative medicine.
EXHIBITOR BOOTHS AND INFORMATION

Booths # 415 / 417
The University of Alabama at Birmingham Department of Biomedical Engineering
1825 University Boulevard, Suite 801
Birmingham, AL 35294-2182
Phone: 205-996-6936
Email: uabbmegrad@uab.edu
Web: www.eng.uab.edu/bme
The BME department at The University of Alabama-Birmingham offers Master, PhD, and M.S.B.M.E. with Certificate in Life Sciences Entrepreneurship. The BME interdisciplinary programs including the areas of tissue engineering, biomechanics, cardiac electrophysiology, etc. The program include 20 primary and 46 secondary faculty members. BME graduates find employment in universities, industries, and regulatory agencies. In 2015, it became a joint department in School of Medicine and School of Engineering with the hiring of a new Chairman, Dr. Jianyi Jayö Zhang, MD, PhD, and successful addition of 6 new faculty. The new BME department is in the top 20 joint BME departments in US on NIH funding.

Booth # 421
The University of Arizona Biomedical Engineering
P.O. Box 210240
Tucson, AZ 85721
Phone: 520-626-9134
Email: bmegidp@email.arizona.edu
Web: www.bme.arizona.edu
The University of Arizona’s Biomedical Engineering Graduate Interdisciplinary Program offers opportunities to integrate engineering, mathematics, biology, and medicine in a collaborative multi-disciplinary environment with over 60 faculty mentors. Proximity to Medicine, and Health Sciences Colleges facilitates cutting-edge translational research in specialties such as cardiovascular engineering, imaging, nanotechnology, computational modeling and entrepreneurship.

Booth # 121
University of Arkansas Biomedical Engineering
790 West Dickson Street, Room 120
Fayetteville, AR 72701
Phone: 479-575-4786
Email: kkarsted@uark.edu
Web: www.biomedical-engineering.uark.edu
The Biomedical Engineering Program at the University of Arkansas offers MS and PhD degrees. Our active faculty has research programs in: Organ Regeneration; Cell and Molecular Imaging; Nanobiotechnology; Molecular Genetics and Cell Biology in Disease Prevention; Biomaterials; Tissue Engineering; and Vaccine and Immunotherapy Delivery Systems. Stop by our booth and learn how well qualified students can earn $10,000 to $20,000 per year on top of standard assistantship stipends!

Booth # 422
University of Calgary
2500 University Drive NW
Calgary, Alberta T2N 1N4 Canada
Phone: 403-210-9733
Email: kdrinker@ucalgary.ca
Web: www.ucalgary.ca/bme/graduate

Booth # 610
University of California, Berkeley Bioengineering
306 Stanley Hall, MC1762
Berkeley, CA 94720-1762
Phone: 510-642-5833
Email: bioeng@berkeley.edu
Web: http://bioeng.berkeley.edu/
The Department of Bioengineering at the University of California, Berkeley will be showcasing its novel research and academic programs, including the bachelor, Master of Engineering, Master of Translational Medicine, and PhD degrees. Come visit the UC Berkeley booth to speak with representatives and learn more about the department.
EXHIBITOR BOOTHS AND INFORMATION

Booth # 923
The University of California, Davis
Department of Biomedical Engineering
451 E. Health Sciences Drive, GBSF 2303
Davis, CA  95616
Phone:  530-752-1033
Email:  bme@ucdavis.edu
Web:  www.bme.ucdavis.edu
With 35 primary faculty and a graduate group of 75 faculty, BME at UC Davis combines exceptional teaching with state-of-the-art research to prepare students for careers in academics and industry. Come learn about our programs in bioinformatics, biomechanics, cellular and molecular systems, imaging, synthetic biology, and tissue engineering and regenerative medicine.

Booths # 414 / 416
University of California, Irvine
3120 Natural Sciences II
Irvine, CA 92697-2715
Phone:  949-824-3494
Email:  bme@uci.edu
Web:  www.eng.uci.edu/dept/bme

Booth # 109
UC San Diego
9500 Gilman Drive MC0412
San Diego, CA  92093
Phone:  858-822-3441
Email:  gmoreira@ucsd.edu
Web:  http://be.ucsd.edu/

Booth # 211
University of Chicago
Institute for Molecular Engineering
5640 South Ellis Avenue, ERC 299
Chicago, IL  60637
Phone:  773-834-1437
Email:  ime@uchicago.edu
Web:  http://ime.uchicago.edu
The IME PhD program equips students with engineering principles to analyze and design molecules for emerging applications, taking research beyond the boundaries of traditional engineering fields. Students work closely with faculty and peers in combining problem-solving skills with broad scientific expertise to build useful systems from the molecular level up.

Booth # 325
University of Colorado Denver/
Anschutz Medical Campus
Department of Bioengineering
12705 E. Montview Blvd., Suite 100
Aurora, CO  80045
Phone:  303-724-5893
Email:  bioengineering@ucdenver.edu
Web:  www.ucdenver.edu/bioengineering

Booth # 720
University of Delaware
161 Colburn Lab
150 Academy Street
Newark, DE  19716
Phone:  302-831-4578
Email:  edmanson@udel.edu
Web:  www.bme.udel.edu
University of DelawareÆs Biomedical Engineering Department welcomes undergraduate and graduate students who are intellectually motivated, creative, and diverse individuals to join us. Our research focus areas: Musculoskeletal and Neural Engineering; Cancer Diagnosis and Therapy; Disease Modeling; Tissue and Regenerative Engineering.
University of Florida
Department of Biomedical Engineering
1275 Center Drive, Biomedical Sciences Building JG-56
P.O. Box 116131
Gainesville, FL 32606
Phone: 352-273-9222
Email: info@bme.ufl.edu
Web: www.bme.ufl.edu

UF BME is made possible by the vision and generosity of Dr. J. Crayton Pruitt and his family. Since its inception in 2002, the department continues to excel in interdisciplinary research that merges engineering with biology and medicine. The department offers both a graduate program and an undergraduate program (2012 inaugural class), with particular strengths in Neural Engineering, Imaging and Medical Physics, Biomaterials and Regenerative Medicine, and Biomedical Informatics and Modeling. In the past year, the department has grown to 22 faculty and will continue that growth up to 25-30. UF BME is one of only a few departments in the nation to be co-localized with a top-ranked medical school, veterinary school, and dental school. The department is also uniquely positioned to contribute to clinical translation of biomedical technologies because of the outstanding resources for entrepreneurship and commercialization in the Gainesville area.

University of Illinois at Chicago
851 S. Morgan Street, Room 218
Chicago, IL 60607
Phone: 312-996-2335
Email: bioe@uic.edu
Web: www.bioe.uic.edu

One of the first degree granting and accredited Bioengineering programs in the nation, since 1965 UIC Bioengineering offers B.S., M.S., Ph.D., M.D./M.S. and M.D./Ph.D. programs that emphasize translational research and innovative training that can include clinical immersion and industry-linked interdisciplinary medical product development. The Richard and Loan Hill Department of Bioengineering is led by 30 core and more than 100 affiliate faculty who collaborate with researchers in five major academic medical centers in Chicago—including UIC, home of the largest medical school in the country.

University of Illinois @ Urbana-Champaign
1304 W. Springfield Avenue, 1270 DCL
Urbana, IL 61801
Phone: 217-333-1867
Email: bioengineering@illinois.edu
Web: bioengineering.illinois.edu

With strengths in biomolecular imaging, bio-nanotechnology, computational bioengineering, cellular and tissue engineering, synthetic bioengineering, and health care systems engineering, the Department of Bioengineering at Illinois is addressing grand challenges in human health and sustainability. Come join a top-ranked engineering school and one of the fastest-growing, innovative bioengineering departments. We are committed to providing the best experience for our students and training future bioengineering leaders by incorporating diverse topics of science, engineering, technology and medicine into our teaching. We offer BS, MS, MEng, and PhD degrees and are driving the development of the new Carle Illinois College of Medicine, one of the nation’s first engineering-based medical schools.
Booth # 409
University of Illinois @ Urbana-Champaign
Master of Engineering
(Professional Master’s Program)
1304 W. Springfield Avenue
1270 Digital Computer Lab, MD-278
Urbana, IL 61801
Phone: 217-333-1867
Email: bioemeng@illinois.edu
Web: bioemeng.illinois.edu
Illinois’ Master of Engineering in Bioinstrumentation, with special focus on medical imaging, is an intensive professional degree program that is available on-campus as well as online. The program trains engineers to be industry leaders by combining rigorous graduate-level engineering coursework with fundamental business training on issues that confront professionals who develop products for biomedical imaging, medical diagnostics, genomics, and tools used in life science research. The program is designed as a unique discovery experience, offering greater technical depth than is possible in an undergraduate program. At Illinois, you’ll delve into the fine points of biometric sensors, imaging technology, and life-changing clinical devices. You’ll also gain the hands-on experience, leadership ability, and unparalleled skills needed to be successful in your chosen career.

Booth # 625
University of Iowa Department of Biomedical Engineering
103 S. Capitol Street
Iowa City, IA 52242
Phone: 319-335-5632
Email: courtney-bork@uiowa.edu
Web: www.engineering.uiowa.edu/bme
The University of Iowa Department of Biomedical Engineering offers graduate research programs in the following research areas: Biomedical Imaging, Biomaterials, Cardiovascular Biomechanics, Bioinformatics, Musculoskeletal Biomechanics, Tissue Engineering and Cellular Analysis. The Department is located close to a tertiary-care teaching hospital, and the Colleges of Dentistry, Medicine, Nursing, and Public Health. Iowa City is ranked number 4 in the Top 10 College Destinations (AIER), is a UNESCO City of Literature, and is a Top 100 Adventure City (NatGeo Adventure). Stop by our booth for more information.
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FOR MORE INFORMATION  
EMAIL: bioengineering@illinois.edu  
WEB: medicine.illinois.edu
The University of Kansas
1520 West 15th, Room 1, Eaton Hall
Lawrence, KS 66045
Phone: 785-864-5258
E-mail: bioe@ku.edu
Web: http://bio.engr.ku.edu/

KU Bioengineering is an exciting and dynamic place. Our curriculum is broad and flexible, embracing the interdisciplinary nature of the field. With six tracks; Bioimaging, Bioinformatics, Biomolecular, Biomedical Product Design & Development, Biomechanics & Neural, and Biomaterials & Tissue; and a collaboration with the University of Kansas Medical Center, students customize their education and create a niche of research before they enter the job market.

University of Kentucky
Department of Biomedical Engineering
522 Robotics and Manufacturing Building
143 Graham Avenue
Lexington, KY 40506
Phone: 859-257-8101
Email: bmedgs@uky.edu
Web: www.bme.uky.edu

The University of Kentucky offers B.S., M.S., and Ph.D. degrees in BME. Graduate level research are organized as interdisciplinary through the Institute of Biomedical Engineering. Faculty from the College of Engineering, Graduate School of Medicine, College of Veterinary Medicine, and College of Education, Health, and Human Sciences work collaboratively to teach courses and perform research.

Fischell Department of Bioengineering
University of Maryland
College Park MD 20742
Phone: 301-405-8268
Email: bioe-grad@umd.edu
Web: bioe.umd.edu

The Fischell Department of Bioengineering at the University of Maryland is the home of an emerging academic discipline, challenging degree programs, and faculty and students who want to make a difference in human health care through education, research, and invention. We will open our new state-of-the-art facility, Clark Hall, in 2017.

University of Memphis/University of Tennessee Health Sciences Center Biomedical Engineering
330 Engineering Technology Building
Herff College of Engineering
Memphis, TN 39152-3210
Phone: 901-678-3733
Email: eckstein@memphis.edu
Web: www.memphis.edu/bme

The UM/UT Joint Graduate Program offers M.S. and Ph.D. degrees in biomedical engineering with research specialization in biomaterials, tissue engineering, drug delivery, biomechanics, biomedical sensors, electrophysiology, and bioimaging. Emphasis in these disciplines is in dental/orthopedics, computational models (pulmonary, coronary, and muscoskeletal), sensor nano/microfabrication, and image processing and analyses.

Booths # 821 / 823

University of Miami
Department of Biomedical Engineering
1251 Memorial Drive
Coral Gables, FL 33146
Phone: 305-284-2445
Email: bme.coa@miami.edu
Web: www.miami.edu/bme

Our undergraduate and graduate programs leading to the B.S., 5 year B.S./M.S., M.S and Ph.D. degrees provide graduates with the analytical and design skills required to solve problems at the interface of engineering and life sciences. Special features of our program include small class size, very strong ties with the University of Miami Miller School of Medicine, high level of student-faculty interaction, and a high percentage of undergraduate student participation in research and professional activities. The research areas of our Faculty include biomedical imaging, optics and lasers; neural engineering, biosignals and instrumentation; and biomechanics, biomaterials and tissue engineering.

A warm welcome and congratulations on attending another great Annual Fall Meeting of the Biomedical Engineering Society.

Come learn about Biomedical Engineering education offered by our Joint Graduate Program by visiting with us at the booth or our websites at:

www.memphis.edu/bme or
www.uthsc.edu/bme.
EXHIBITOR BOOTHS AND INFORMATION

Booth # 615

University of Minnesota Department of Biomedical Engineering
312 Church St. SE
7-105 Nils Hasselmo Hall
Minneapolis, MN 55455
Phone: 612-624-8396
E-mail: bmenpg@umn.edu
Web: www.umn.edu/bme

The Department of Biomedical Engineering at the University of Minnesota is physically located at the intersection of the medical school, engineering, and physical sciences, and in the heart of LifeScience Alley (home to Medtronic, Boston Scientific, St. Jude Medical, plus 500 other FDA-registered medtech companies). Research conducted by the faculty spans the full spectrum, with particular depth in cardiovascular engineering, neural engineering, cell/tissue engineering, cancer bioengineering, and biomedical imaging/optics.

Booths # 403 / 405

University of North Carolina at Chapel Hill NC State University
137 MacNider Hall
Chapel Hill, NC 27599
Phone: 919-445-6051
E-mail: vberg@email.unc.edu
Web: www.bme.unc.edu

The Joint Department of Biomedical Engineering was founded in 2003 and is co-located at the University of North Carolina at Chapel Hill and NC State University. Linking the School of Medicine and College of Arts and Sciences at UNC-CH to the College of Engineering at NC State, the graduate program offers joint MS and PhD degrees in Biomedical Engineering in five core research areas including Rehabilitation Engineering, Regenerative Medicine, Medical Imaging, Biomedical Microdevices and Pharmacoengineering. With over 30 tenured and tenure track core faculty members, our graduate program embraces interdisciplinary collaborations spanning the basic sciences through to clinical and translational applications.

Booth # 903

University of Oklahoma Stephenson School of Biomedical Engineering
202 W Boyd Street, CEC 107
Norman, OK 73019
Phone: 405-325-5453
Email: bme@ou.edu
Web: www.ou.edu/coe/sbme

OU is home to the newest BME department in the nation, with established M.S. and Ph.D. programs. Located in a vibrant research and startup community with the nearby Oklahoma Health Sciences Center (OUHSC), the Oklahoma Medical Research Foundation, and various entrepreneurial entities, BME students and faculty work in a translational environment with physicians and companies. Faculty candidates are invited to visit us and inquire about Endowed Professorships, and students are encouraged to ask about Stephenson Graduate Fellowships and translational research partnerships with the OUHSC.

Booths # 900 / 902

University of Pittsburgh Department of Bioengineering
306 CNBIO
300 Technology Drive
Pittsburgh, PA 15219
Phone: 412-624-6445
Email: ngm8@pitt.edu
Web: engineering.pitt.edu

The University of Pittsburgh Department of Bioengineering conducts world-class research and is home to faculty and students at both the graduate and undergraduate level who have won both nationally and internationally recognized awards. The department also has a close affiliation with the renowned University of Pittsburgh School of Medicine.

Booth # 608

University of Rochester
204 Robert E. Georgen Hall
Rochester, NY 14627
Phone: 585-275-3891
Email: donna.porcelli@rochester.edu
Web: www.bme.rochester.edu

The Graduate Program in Biomedical Engineering at the University of Rochester provides training at the Masters and Doctoral level. Multiple active centers and affiliated groups offer collaborative research in Biomedical Optics; Neuroengineering; Biomechanics; Medical Imaging; Biomaterials, Nanotechnology and Cell & Tissue Engineering. With access to over 50 laboratories on the River Campus and the adjacent Medical Center, students can tailor their own interdisciplinary and translational training experience. We also offer an MS program focused on Medical Technology & Innovation, including a clinical practicum and full-year design experience.

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For questions, contact PJ Meek at pjmeek@ou.edu or (405) 325-5453.
To learn about the multiple Stephenson Endowed Professorships and
Stephenson Graduate Fellowships, contact Michael Detamore, director of the Stephenson School of
Biomedical Engineering at detamore@ou.edu.
Booth # 705
University of Southern California
Viterbi School of Engineering
3650 McClintock Ave, OHE 106
Los Angeles, CA 90089
Phone: 213-740-4488
Email: viterbi.gradprogram@usc.edu
Web: http://viterbi.usc.edu/gapp

Booth # 908
University of South Dakota
Biomedical Engineering
4800 North Career Avenue, Suite 221
Sioux Falls, SD 57107
Phone: 605-367-7763
Email: bme@usd.edu
Web: www.usd.edu/bme
The Biomedical Engineering Graduate Program at the University of South Dakota works at the interface of engineering and medicine. Research training emphasizes engineering biomaterials that can repair or replace damaged tissues and treat critical diseases. Course curriculum reflects the interdisciplinary nature of biomedical engineering and includes coursework in biomaterials, biomechanics, and bioinformatics. Faculty candidates and students are encouraged to visit our booth for more information.

Booths # 308 / 310
University of Tennessee—Knoxville
1512 Middle Drive
414 Dougherty Engineering Bldg
Knoxville, TN 37996
Phone: 865-974-5115
Email: mabeinfo@utk.edu
Web: http://mabe.utk.edu
The University of Tennessee offers B.S., M.S., and Ph.D. degrees in BME. Graduate level research are organized as interdisciplinary through the Institute of Biomedical Engineering. Faculty from the College of Engineering, Graduate School of Medicine, College of Veterinary Medicine, and College of Education, Health, and Human Sciences work collaboratively to teach courses and perform research.

Booth # 411
The University of Texas Arlington
Bioengineering Department
500 UTA Blvd
Arlington, TX 76019
Phone: 817-272-2249
Email: cbradfield@uta.edu
Web: www.uta.edu/bioengineering
The Bioengineering Department at The University of Texas Arlington offers several research and scholarship opportunities for students interested in Biomaterials & Regenerative Tissue Engineering, Bioinstrumentation, Biomechanics, and Biomedical Imaging. Graduate students also have the option of earning a joint graduate degree with The University of Texas Southwestern Medical Center at Dallas. Those interested in our programs are strongly encouraged to visit Booth 411 at the exhibit to learn more!

Booths # 621 / 623
The University of Texas at Austin
Department of Biomedical Engineering
107 W. Dean Keeton, C0800
Austin, TX 78712
Phone: 512-471-3604
Email: sbixby@mail.utexas.edu
Web: www.bme.utexas.edu
The University of Texas at Austin’s Biomedical Engineering Department educates the next generation of biomedical engineers by offering B.S., M.S., and Ph.D. degrees. Scholars and students build interdisciplinary knowledge in areas such as bioinformatics, biomechanics, biomedical imaging and instrumentation, cellular and biomolecular engineering, and computational biomedical engineering, among others.

Booth # 223
University of Texas at Dallas
2850 Rutford Avenue
Richardson, TX 75080
Phone: 972-883-5155
Email: ben.porter@utdallas.edu
Web: www.be.utdallas.edu
The University of Texas at Dallas presents their Biomedical Engineering Degree programs to future students and the highly competitive Eugene McDermott Graduate Fellowship for outstanding PhD applicants. Information about UT Dallas’s research programs in bioinformatics, biomaterials, biomechanics, biomedical imaging and optics, biosensors, and neural engineering will also be available.

Booth # 1000
University of Texas at San Antonio
One UTSA Circle AET 1.102
San Antonio, TX 78249
Phone: 210-458-8529
Email: teja.guda@utsa.edu
Web: www.engineering.utsa.edu/BME/

Booth # 425
University of Toronto
Institute of Biomaterials & Biomedical Engineering
164 College Street
Rosebrugh Building, Room 407
Toronto, Ontario M5S 3G9 Canada
Phone: 416-978-4841
Email: jeffrey.little@utoronto.ca
Web: www.ibbme.utoronto.ca
The U of T Institute of Biomaterials & Biomedical Engineering (IBBME) is a multidisciplinary research unit where investigators and students from engineering, medicine and dentistry collaborate with 10 major hospitals to develop solutions for our most pressing healthcare challenges. Our programs in biomedical and clinical engineering offer a world-class education at Canada’s #1 ranked university.
One of our distinctive strengths in interdisciplinary research is our relationship with Pitt’s School of Medicine and Schools of the Health Sciences, as well as with the McGowan Institute for Regenerative Medicine. Bioengineering is also deeply embedded within clinical research at University of Pittsburgh Medical Center, one of the top ranked hospital networks in the country. Faculty have laboratories within clinical departments, which allow graduate students to apply engineering principles directly to patient care in bench-to-bedside settings.

Most importantly for our graduate students, Pitt is an urban campus in one of the most livable cities in the world. Its world-class research institutions, corporate headquarters, public amenities, healthcare, low cost of living and relative safety have earned Pittsburgh accolades from Forbes, Kiplingers, National Geographic, The Economist, and US News & World Report. Both the University and the City provide the perfect match for an outstanding graduate school environment.

Please visit engineering.pitt.edu/bioengineering for a full explanation of graduate program requirements and admissions information.

RESEARCH FOCUS AREAS
- Biomaterials for Drug Delivery
- Tissue Engineering and Regenerative Medicine
- Nanomaterials for Biological Sensing
- Biomechanics in Tissue Engineering
- Regenerative Medicine
- Cellular Biomechanics
- Bioinformatics

Our Biomedical Engineering (BME) program focuses on the application of engineering and science methodologies to the analysis of biological and physiological problems and the development and delivery of biomedical technologies. Our program is located in Sioux Falls, South Dakota, near the borders of Iowa and Minnesota at the junction of Interstates 90 and 29, putting it within a day’s drive of most major Midwestern cities.
A Closely Knit Community

Nestled into Utah’s Wasatch Mountain range, the Department of Bioengineering’s home (foreground) is located between the University Hospital & School of Medicine (upper left) and the College of Engineer Campus (just to the right out of frame) providing a clinically immersive engineering experience that is unique among BME training programs. Did you know that the Department of Bioengineering is one of the oldest and yet fastest growing Biomedical training programs in the nation? We rank 7th nationally in median h-index for core faculty, as determined by Google scholar. With over 125 faculty, our research strengths span every inch of clinical medicine. Not to mention that we are surrounded by unsurpassed natural beauty. Learn more about us at: bioen.utah.edu
PhD in Biomedical Engineering

Offered by the Department of Bioengineering at The University of Texas at Dallas, the Biomedical Engineering PhD program has over 20 research faculty with more than $20M in active funding from the NIH, NSF, DARPA and industry partners.

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Application Deadline: December 15, 2016

For More Information:
972.883.5155
bmenadvising@utdallas.edu
be.utdallas.edu
EXHIBITOR BOOTHS AND INFORMATION

Booth # 504
University of Virginia
P.O. Box 800762
Charlottesville, VA 22908
Phone: 434-924-5101
Email: ran2x@virginia.edu
Web: http://bme.virginia.edu
Using our perspective as engineers, we make ground-breaking discoveries in fields like systems biology and biomedical data sciences, medical imaging, and cellular and tissue engineering. We are co-located in the medical school, and our department’s remarkable tendency toward collaboration reflects a culture of cooperation that has been essential to UVA going all the way back to Thomas Jefferson.

Booth # 801
University of Washington
Department of Bioengineering
3720 15th Avenue NE
Box 355061
Seattle, WA 98195
Phone: 206-616-3371
Email: bluek2@uw.edu
Web: http://depts.washington.edu/bioe/index.html
University of Washington Bioengineering is a world leader in bioengineering research, education, clinical applications, technology transfer, and service. Please visit booth 801 to discover how we are inventing the future of medicine. Our faculty and students are eager to talk to you!

Booth # 616
University of Wisconsin - Madison Biomedical Engineering Department
1550 Engineering Drive
Madison, WI 53706
Phone: 608-890-1370
Email: biomed@engr.wisc.edu
Web: www engr wisc edu/bme/bme html
Please visit our booth to learn more about the B.S., M.S., and Ph.D. programs in Biomedical Engineering at the University of Wisconsin-Madison. Staff, students, and faculty will be available to answer your questions and provide information on admissions, curriculum, and our world-class facilities and institution-wide research centers and institutes.

Booths # 609 / 611
Vanderbilt University
5824 Stevenson Center Drive
Nashville, TN 37235
Phone: 615-343-1099
Email: tina.shaw@vanderbilt.edu
Web: www.vanderbilt.edu
VU BME bridges Vanderbilt’s engineering, basic science departments, and its renowned medical center; an ideal location for engineering research at the interface of technology and medicine. Research strengths include image-based technologies, nanobiotechnology, biophotonics, modeling, biomaterials, bioregenerative engineering, bioMEMs. VU BME stimulates high impact research and provides unique educational opportunities.
Booths # 315 / 317
Virginia Commonwealth University
401 W. Main Street
Richmond, VA 23284
Phone: 804-828-7956
Email: biomedicalengr@vcu.edu
Web: www.biomedical.engr.vcu.edu

VCU Biomedical Engineering has strong ties with the VCU Medical Center, School of Medicine, School of Dentistry, and Massey Cancer Center, and offers degrees at the Bachelor’s, Master’s, and Doctoral level. Research specialties include mechanobiology, regenerative medicine, orthopaedic biomechanics, rehabilitation engineering, and biomaterials. The department is actively recruiting faculty.

Booths # 600 / 601 / 602 / 603 / 604 / 605
Virginia Tech-Wake Forest University School of Biomedical Engineering & Science
VT-WFU SBES:
317 Kelly Hall
325 Stanger Street
Mail Code 0298
Blacksburg, VA 24061
Phone: 540-231-8191
Email: mlawless@vt.edu
Web: www.sbes.vt.edu

The Virginia Tech - Wake Forest University, School for Biomedical Engineering and Sciences offers MS, PhD, MD/PhD, and DVM/PhD degrees. We have 76 biomedical engineering faculty with active research programs in tissue engineering, biomedical imaging, biomechanics, nano-medicine, & nanobioengineering, neuroengineering, translational cancer research, cardiovascular engineering, and other emerging fields.
The master’s and doctoral programs in biomedical engineering at WPI produce leaders and entrepreneurs highly valued in today’s workplace. Find your place here, among researchers who are seeking innovative ways to improve lives.

GRAD.WPI.EDU
MS
PhD
MD/PhD
DVM/PhD
APPLICATION DEADLINE: JAN. 1
**Booths # 322 / 324**

**Worcester Polytechnic Institute (WPI)**

100 Institute Road  
Worcester, MA 01609  
Phone: 508-831-5301  
Email: bme-web@wpi.edu  
Web: www.wpi.edu/+gradbme

Graduate students in WPI’s Biomedical Engineering (BME) Department collaborate with scientists and engineers across disciplines, seeking breakthroughs in regenerative medicine, innovations in bioinstrumentation, and major steps forward in healthcare. Whether in the classroom or the lab, the focus remains squarely on solving real-world problems. BME graduates have gone on to rewarding careers at major medical and biomedical research centers across academia, government, and the medical device industry.

**Booth # 321**

**Yale University**

55 Prospect Street  
New Haven, CT 06511  
Phone: 203-432-4262  
Email: deanna.lomax@yale.edu  
Web: www.seas.yale.edu/departments/biomedical-engineering

The booth will be staffed with graduate representatives and faculty from the department of Biomedical Engineering at Yale. The faculty and graduate representative will aim to describe the program to interested visitors and answer any questions regarding the program requirements and admissions process.
The Whitaker International Program provides young biomedical engineers, and those in a related field, the opportunity to expand their geographic and academic horizons.

Potential activities to pursue overseas include:
- conducting research at an academic institution or with a corporation
- interning at a policy institute
- studying for a post-baccalaureate degree
- pursuing post-doctoral work

For more information, including program details, application requirements, and the online application, visit our website.

ACTIVITIES
A Whitaker International grant experience will ideally advance your career, while also advancing the goal of increased international collaboration in BME.

Activities could include:
Type of Awards:
- Fellows Award: one year award after receiving your bachelor's degree.
- Scholars Award: for post-doctoral work.
- Summer Award: for BME coursework or research towards your Master's or Ph.D. degree.
Meeting Location

**Minneapolis Convention Center**
1301 Second Ave South
Minneapolis, Minnesota 55403
612.335.6000

**Hilton Minneapolis**
1001 Marquette Avenue South
Minneapolis, Minnesota 55403-2440
612.376.1000

Registration

Paid registration is required for admission to all meeting functions including scientific sessions, posters, exhibits, breaks and the BMES BASH on Friday evening. BMES cancellation policy may be found on any registration form. Any applicable refunds will be issued post-meeting. Substitutions are permitted with written permission from the original registrant. Additional social event tickets including the Celebration of Minorities in BME Luncheon, and the Women in BME Luncheon are separate and above BMES meeting registration.

**On-Site Registration Hours**

Wednesday, October 5 12:00 pm – 7:00 pm
Thursday, October 6 7:00 am – 6:00 pm
Friday, October 7 7:00 am – 6:00 pm
Saturday, October 8 7:00 am – 2:00 pm

Exhibits

Exhibits will be open:
Thursday, October 6 9:30 am – 5:00 pm
Friday, October 7 9:30 am – 5:00 pm
Saturday, October 8 9:30 am – 1:30 pm

Biotechnology Company Tours

**Wednesday, October 5**
2:30 pm – 5:30 pm
Advance registration required
Buses will depart from the convention center entrance.

BMES Presenter Information

**Platform Presentations**

Each technical session room will be equipped with a PC-compatible computer with a USB port and PowerPoint along with an LCD projector, screen and a lectern with microphone.

During the half hour before your session begins, please upload your presentation onto the computer using a memory stick or flash drive. Because of the potential difficulty transferring some Mac files to PC format, we encourage you to avoid use of animation if there is a question about transferability.

Please do not try to connect your own laptop. Please note, it will not be possible to provide special equipment. Any additional equipment will need to be supported by the presenter. Although BMES has paid for WiFi throughout the convention center during the Annual Meeting, there will not be specific dedicated hard-wired internet access in the meeting rooms.

Sessions chairs should keep sessions on the listed schedule so attendees can move back and forth among sessions. In most cases, presentations should be done in twelve minutes, allowing three minutes for questions and answers and transition to the next speaker.

**Poster Presentations**

Posters will be presented Thursday, Friday and Saturday. Posters are to be displayed all day on assigned day. Authors must be present during specified viewing with authors as listed in the Scientific Program:

- **Thursday** 9:30 am – 10:15 am and 2:30 pm – 3:15 pm
- **Friday** 9:30 am – 10:15 am and 3:15 pm – 4:00 pm
- **Saturday** 9:30 am – 10:15 am

All posters will be in the Exhibit Hall B-C in the Minneapolis Convention Center. Posters are numbered with a card corresponding to the numbers assigned in the program.

**Speaker Ready Room**

Registration Area, Exhibit Hall of the Minneapolis Convention Center

In the BMES Speaker Ready Room you will find cables, LCD projector and screen to practice your presentation. Please bring your own laptop.

- **Wednesday, October 5** 1:00 pm – 5:00 pm
- **Thursday, October 6** 7:00 am – 5:00 pm
- **Friday, October 7** 7:00 am – 5:00 pm
- **Saturday, October 8** 7:00 am – 2:30 pm
**Program Highlights—Don’t Miss These Events!**

**Wednesday, October 5**

**Meet the Faculty Candidate Forum**
3:30 pm–5:30 pm  
Exhibit Hall B | CC

The "Meet-the-Faculty Candidate" poster session provides a great opportunity for faculty, recruiters, and Department Chairs to speak directly with recent PhD grads and post-doctoral researchers who are seeking faculty positions.

The BMES 2016 Annual Meeting *Meet The Faculty Candidate Forum* was only open to those who are actively on the market for the 2016–2017 recruiting cycle. Candidates submitted for consideration in August. The accepted candidates’ CVs can be viewed at www.bmes.org.

**Welcome Reception**
5:30 pm–7:00 pm  
Hall B-C Foyer | CC

Light refreshments will be served. All registrants are invited to attend.

**LGBT Dessert Social**
8:00 pm–9:00 pm  
Symphony III, Minneapolis Hilton

*additional registration and $10 ticket required.

Manu Platt, PhD, Associate Professor of Biomedical Engineering at the Georgia Institute of Technology and Emory University, is the speaker for the BMES LGBT dessert social hour. He will speak about navigating a career and life while feeling like an outsider, which has motivated him to create open and inclusive safe spaces for communities of outsiders. He will discuss intersectionality and the complexities of fusing orientation, ethnicity, gender, religion, education, family values and more that define each person’s unique approaches to solving problems as humans and as biomedical engineers. Introductory remarks will be made by Shelly Peyton, Assistant Professor of Chemical Engineering at the University of Massachusetts, Amherst. Prof. Platt’s talk will be followed by dessert and a cash bar.

LGBT Social Sponsored by:

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**Thursday, October 6**

**BMES State of the Society Address & Wallace H. Coulter Award for Healthcare Innovation Lecture**
10:15 am  
Auditorium | CC

Please join us for a dialogue with BMES President Rich Hart and other leaders of the Society.

**Friday, October 7**

**BMES Bash at the Minneapolis Convention Center**
8:30 pm–11:00 pm

Join us for a Dessert Party this year to celebrate the 2016 BMES Annual Meeting. We listened to our attendees and members, that they would like to enjoy dinner at the myriad of restaurants in downtown Minneapolis (more than 30 within walking distance of the convention center) and then cap the evening off with some dessert and networking.

**Refreshment Breaks**

Please note your meeting registration includes morning and afternoon refreshments breaks on Thursday, Friday and Saturday. All refreshment breaks will be in the Exhibit Hall.

*Refreshment breaks are sponsored by:*

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Don’t forget to turn your BMES BASH ticket in for a wristband at the information or registration booths before Friday afternoon.
Celebration of Minorities in BME Luncheon

**Thursday, October 6**

**Celebration of Minorities in BME Luncheon***

11:45 am–12:45 pm  
Ballroom A | CC

*additional registration and $25 ticket required.

This is the seventh year of this event hosted by the BMES Diversity Committee to create a community and network within the Society fostering support and professional development of minorities in BMES at all levels. Everyone is invited to attend, as diversity only increases when all groups play a part. The luncheon complements the Diversity Award lecture on Saturday and the Women in BME Luncheon on Friday.

**Karl W. Reid, Ed.D.,**  
Executive Director of the National Society of Black Engineers (NSBE)

In this presentation, Dr. Reid will share his experience and perspective on barriers to an engineering education and profession, and highlight the NSBE vision to dramatically change the face of engineering by 2025.

Karl W. Reid, Ed.D. was named executive director of the National Society of Black Engineers (NSBE) on June 2, 2014, marking his return to the organization that gave him his first major leadership experience, 31 years earlier. For the past 17 years, he has been a leading advocate for increasing college access and opportunity for low-income and minority youth. Prior to NSBE Dr. Reid was the senior vice president for research, innovation and member college engagement for the United Negro College Fund (UNCF), where he oversaw new program development, research and capacity building for UNCF’s 37 historically black colleges and universities. Before his service at UNCF, he worked in positions of increasing responsibility to increase diversity at his alma mater, the Massachusetts Institute of Technology (MIT), which he left as associate dean of undergraduate education and director of the Office of Minority Education. While working at MIT, Dr. Reid earned his Doctor of Education degree at Harvard University. His thesis explored the interrelationship of race, identity and academic achievement.

Dr. Reid graduated from MIT, where he did his undergraduate and master’s work in materials science and engineering and was a Tau Beta Pi Scholar. He credits his membership in the NSBE chapter at MIT with giving a vital boost to his self-confidence and leadership skills. He joined the Society during his freshman year, was elected chapter vice president during his junior year and served as NSBE national chair for 1984–85. After graduating from MIT, Dr. Reid worked in the computer industry for 12 years. In 1991, five years into a successful career in sales and marketing with IBM Corporation, Dr. Reid read Jonathan Kozol’s “Savage Inequalities,” a seminal book about educational disparities in the U.S., which sparked his passion for bringing about positive change through education of African Americans.

Dr. Reid is now supporting NSBE’s National Executive Board and the Society’s 31,000 members in reaching the main goal of NSBE’s 10-year Strategic Plan: to move black students and professionals from underrepresentation to overrepresentation in engineering in the U.S., by producing 10,000 Black Engineers annually in the country, by 2025. Dr. Reid is a member of the DC STEM Network Advisory Council and the American Society of Civil Engineers’ “Dream Big” IMAX Movie Technical Advisory Council, and was recently named one of the “Top 100 Executives in America” by Uptown Professional magazine.

*Diversity Luncheon is Sponsored by:*
An Unorthodox Career Path: From Practicing Physician to Playing One on TV

Our career trajectories are shaped by a series of opportunities and our courage to grow and change. All too often, however, the decisions we make are constrained by the conventional boundaries of the professional designations behind our name. Dr. Archelle Georgiou started her professional life as a practicing physician but over the following 25 years, she made 7 major shifts that took her career from medicine to managed care to the media. The key to navigating this unorthodox path has been self-awareness of her innate talents. Dr. Georgiou will use examples from her personal experiences to describe why and how we should commit to our calling versus a traditional career storyline.

Archelle Georgiou, MD,
Founder of Georgiou Consulting

Dr. Archelle Georgiou started her professional life as a practicing physician but over the following 25 years, she made 7 major shifts that took her career from medicine to managed care to the media. The key to navigating this unorthodox path has been self-awareness of her innate talents. Dr. Georgiou will use examples from her personal experiences to describe why and how we should commit to our calling versus a traditional career storyline.

Dr. Archelle Georgiou is a physician, a “recovering” health-care industry executive, data lover, and health reporter. Her broad base of career experiences naturally let her look at health through the eyes of doctors, patients, insurance companies, policy makers, and the media. She founded Georgiou Consulting in 2008 and uses this balanced perspective to help companies with innovative, effective healthcare solutions ignite the change they need for meaningful adoption and improved business results. Most of her clients are outside the traditional healthcare system.

Dr. Georgiou believes that the media has an important role to play in influencing consumers to take responsibility for their health. Since 2007, Dr. Georgiou has been an on-camera medical expert in Minneapolis-St. Paul, initially with Fox9News and currently with KSTP, the ABC affiliate. In her weekly segments and monthly half-hour specials, she’s covered more than 800 compelling health related topics, from the newest medical technology to patient advocacy to health insurance and the latest health care policy change. Archelle is recognized as a speaker with data-driven ideas that challenge the status quo and spark conversations about true health reform. She’s been invited to speak at forums including Tedx, Gallup, Mayo Clinic Transform, Wireless Health Sciences Alliance Summit, Wharton School of Business and Colgate University. She has appeared on Katie’s Take with Katie Couric, Fox Business News and Mehmet Oz & Friends. Her insights regarding change and leadership have been featured in several books including, Motivate Like A CEO and The Millionaire Mystique. In 2014, Dr. Georgiou received Minnesota Magazine’s Champion award for “an individual who has focused their efforts to elevate the profile/status of the state’s health care industry.”

Women in BME Luncheon is Sponsored by:
**Wednesday, October 5**

**BMES Board of Directors Meeting**
8:30 am–4:30 pm  
Room 101HI | CC  
Organizer: Richard Hart

**AIMBE Board of Directors Meeting**
Affiliate Event  
1:00 pm–4:00 pm  
Room 101F | CC  
Organizer: Milan Yager

**AIMBE Academic Council**
Affiliate Event  
4:00 pm–5:00 pm  
Room 101F | CC  
Organizer: Milan Yager

**CMBE SIG Business Meeting**
5:00 pm–7:00 pm  
Room 101G | CC  
Organizer: Elizabeth Loboa

**Council of Chairs Dinner & Meeting**
*Invitation Only*  
6:30 pm–9:00 pm  
Salon E  
Minneapolis Hilton  
Organizer: Don Gaver

**Industry Committee Planning Meeting**
*Invitation Only*  
7:30 pm–8:30 pm  
Boardroom 3  
Minneapolis Hilton  
Organizer: Ben Noe

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**Friday, October 7**

**Education Committee Meeting**
7:00 am–8:00 am  
Room 101G | CC  
Organizer: Donald Gaver

**National Meetings Committee / 2017 Annual Meeting Planning Committee Meeting**
8:00 am–10:00 am  
Room 101HI | CC  
Organizer: John White and Shelly Sakiyama-Elbert

**International Affairs Subcommittee**
8:00 am–9:00 am  
Room 203A | CC  
Organizer: Damir Khismatullin

**Medical Devices SIG Business Meeting**
2:00 pm–3:00 pm  
Room 101HI | CC  
Organizer: Devashish Shrivastava

**Membership Committee Meeting**
3:30 pm–4:30 pm  
Room 101G | CC  
Organizer: Kristen Billiar

**Design Competition Judges Meeting**
3:30 pm–4:30 pm  
Room 203A | CC  
Organizer: Liz DaSilva

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**Saturday, October 7**

**Council of Industry Chapter Presidents—Invitation Only**
8:00 am–9:00 am  
Room 101F | CC  
Organizer: Ben Noe

**Industry Advisory Board—Invitation Only**
9:30 am–10:30 am  
Room 101F | CC  
Organizer: Ben Noe

**Student Affairs Subcommittee**
9:30 am–10:30 am  
Room 203A | CC  
Organizer: Art Ritter

**BMES Board of Directors Meeting**
1:00 pm–3:30 pm  
Room 101HI | CC  
Organizer: Lori Setton

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Most of these meetings/events are invitation only. Please check with the organizer.
Receptions located at the Minneapolis Hilton from 8:00 pm–10:00 pm

Thursday, October 6

**Boston University**
Marquette IX

**Clemson Bioengineering**
Marquette IV

**Cornell University**
Marquette III

**Duke University**
Rochester Room

**The George Washington University**
Grand Ballroom A

**Wallace H. Coulter Department at Georgia Tech & Emory**
Symphony I

**Johns Hopkins University**
Biomedical Engineering Department
Marquette I

**Marquette University/ Medical College of Wisconsin**
Conrad C

**Northeastern University**
Department of Chemical Engineering
Grand Ballroom G

**The Ohio State University**
Symphony III

**Purdue University, Weldon School of Biomedical Engineering**
Conrad D

**Rensselaer Polytechnic Institute**
Boardroom 3

**Rice University Bioengineering**
Marquette VII

**UCLA Bioengineering Department**
Symphony IV

**The University of Alabama at Birmingham**
Grand Ballroom F

**University of California Irvine**
Conrad A

**University of California San Diego**
Grand Ballroom B

**University of Florida**
Conrad B

**University of Illinois at Urbana-Champaign**
Grand Ballroom C

**University of Michigan, Department of BiomedE**
Directors Row 4

**University of Pennsylvania Department of Bioengineering**
Marquette V

**University of Pittsburgh Department of Bioengineering**
Directors Row 2

**University of Rochester**
Grand Ballroom D

**University of Southern California-Viterbi School of Engineering**
Marquette II

**University of Texas at Austin**
Grand Ballroom E

**University of Utah, Department of Bioengineering**
Symphony II

**University of Virginia**
Red Wing

**University of Washington Bioengineering**
Duluth Room

**University of Wisconsin-Madison Biomedical Engineering Department**
Directors Row 3

**Vanderbilt University, Department of Biomedical Engineering**
Marquette V

**Washington University in St. Louis**
Marquette VIII

**Whitaker International Program**
Directors Row 1
Thursday, October 6

8:00 am—9:00 am  Room 205
**Becoming a Biomedical Engineer... What you need to know and where do you fit in**
Learn about the key areas of BME, what BME’s do and how they differ from other engineers. Explore the wide range of career options in industry, academia, clinical, government, research facilities and entrepreneurial. Hear about the BME work environment, and the job outlook to help you decide where you fit in.

9:15 am—10:15 am  Room 205
**BME Careers in Academia**
Hear about the various career paths and opportunities in academia. Faculty will share their insights and experiences to help you prepare for a career in academia or decide if academia is right for you.

1:30 pm—2:45 pm  Room 205
**BME Careers in Industry**
Explore the various industry options for BME professionals. Representatives from industry will share their career paths, educational training, insight into the hiring market, and suggestions for students and recent graduates who wish to pursue the same career.

2:45 pm—4:15 pm  Room 208AB
**Rapid Resume Review**
*Members Only*
Experienced BME professionals will review an electronic or hard copy of your resume and work with you to make improvements.

3:00 pm—5:00 pm  Room 102D
**Coop/Intern and Industrial Relations Workshop**
*Invitation Only*

3:15 pm—4:30 pm  Room 205
**BME Government and Alternative Careers**
Hear about the career paths and educational training as BME alumni share their experience and insight into working in the government, law, regulatory and consulting. Students and recent graduates will take away suggestions for how to pursue these careers.

9:00 am—5:30 pm  Exhibit Hall
**Career Zone**
Join us for our new alternative career fair! The Career Zone is an area bringing together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market.

Panel sessions begin at 8:00 am and last for 60 or 90 minutes. Panel speakers will continue the discussion, take more questions, network and/or recruit in the Career Zone after their scheduled session.

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**Student Chapter Tables**

<table>
<thead>
<tr>
<th>Chapter Tables</th>
<th>Universities</th>
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<tbody>
<tr>
<td><strong>Alpha Eta Mu Beta, The National Biomedical Engineering Honor Society</strong></td>
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<td><strong>Clemson University</strong></td>
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<td><strong>Rice University</strong></td>
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<td><strong>Stevens Institute of Technology</strong></td>
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<td><strong>University of Texas at San Antonio</strong></td>
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One-on-one career coaching will take place in the BMES booth for members only.
Friday, October 7

8:30 am–9:30 am Room 208CD

BMES Student Chapter—Outstanding Chapter Best Practices

Outstanding Student Chapter awardee Virginia Tech/Wake Forest, will provide their chapter best-practices along with, the Commendable Achievement awardee Clemson State University. During this workshop each chapter will have the opportunity to present their chapter’s goals and accomplishments. This will allow new and current student chapters an opportunity to ask questions, exchange ideas and implement new goals for their upcoming year.

9:00 am–10:30 am Room 205

Career Options for BME PhDs

This session is designed specifically for BME PhD students and postdoctoral fellows. It brings together a panel of professionals with PhD degrees in BME or related disciplines employed in industry and academia. Each speaker will share their experiences and useful tips on what BME PhD students and postdocs need to do to land a job in industry or academia.

9:30 am–10:30 am Room 208CD

BMES Student Chapter–Mentoring and Chapter-Industry Best Practices

Outstanding Mentoring awardee University of Illinois, Urbana-Champaign will provide their chapter best-practices along with, the Chapter-Industry awardee The Ohio State University. University of Illinois, Urbana-Champaign will discuss their goals and the success of their mentoring program and The Ohio State University will present their Chapter-Industry best practices. During this workshop, students will have the opportunity to ask questions, exchange ideas and implement new goals for their upcoming year.

1:45 pm–3:15 pm Auditorium

BMES Undergraduate Student Design Competition

During this session we will bring together the top 6 winning design teams that were selected out of 22 applicants. The top 6 include Columbia University, Clemson University, Purdue University, Virginia Commonwealth University, University of Rochester and Rice University. This competition allows each design team to orally present their projects and students to ask questions after each presentation. Upon completion of all presentations, the judges will select and announce the top 3 winners.

2:30 pm–3:45 pm Room 205

BME Careers in Industry

Explore the various industry options for BME professionals. Representatives from industry will share their career paths, educational training, insight into the hiring market, and suggestions for students and recent graduates who wish to pursue the same career.

4:15 pm–5:30 pm Room 205

BME Entrepreneurs

Entrepreneurs discuss the translational path; how to take an idea from concept to commercial product. Hear about resources available to students interested in translating their technologies both within and outside the university, and licensing and start-up options. Panelists will also discuss the skills needed to work in a start-up.

9:00 am–5:30 pm Exhibit Hall

Career Zone

Join us for our new alternative career fair! The Career Zone is an area bringing together students, alumni, and employers for networking, recruiting and industry education. Don’t miss the panel discussions throughout the day featuring alumni and employers who will share their career paths, advice, and the BME job market.

Panel sessions begin at 9:00am and last for 60 or 90 minutes, ending at 5:30pm. Panel speakers will continue the discussion, take more questions, network and/or recruit in the Career Zone after their scheduled session.
Learn about BME career opportunities in industry, academia and clinical
Present your research work at the poster session
Network with your peers and leaders in the field
Hear about entrepreneurship and alternative careers
Learn how to market yourself
Alpha Eta Mu Beta (AEMB) Programs

Thursday, October 6

4:30 pm–5:15 pm Room 200A/CC

Alpha Eta Mu Beta Annual Grand Meeting

Session Co-chairs: Dominic E. Nathan PhD, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wolfson, BS, Marcia A. Pool, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Kerri A. Green, MS and Teresa A Murray PhD.

At this annual grand meeting, members representing chapters nationwide will come together to discuss important contemporary events relating to AEMB. (Attendance is mandatory for all AEMB members). If you would like to learn more about AEMB or start a new chapter at your school, please consider attending this session and speaking to any of the national officers. This year there will be elections of national officers and members to the board of directors.

Thursday, October 6

6:30 pm–8:00 pm Lounge A, Level 2/CC

Alpha Eta Mu Beta Reception

Session Co-chairs: Dominic E. Nathan PhD, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wolfson, BS, Marcia A. Pool, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Kerri A. Green, MS and Teresa A Murray PhD.

The Annual AEMB reception will be held at Lounge A, Level 2. New charters and national awards will be presented at this session. Furthermore, this session will serve as a networking opportunity to meet with other fellow members from AEMB chapters, representatives from industry and academia. This session is open to all AEMB student and faculty members. For tickets, please contact aemb@alphaetamubeta.org

Alpha Eta Mu Beta (AEMB)–Annual Ethics Session

Friday, October 7

10:00 am Room 200A/CC

Ethical Issues in Developing Tuberculosis Vaccines and Drugs

Session Co-chairs: Susan L. Craddock, PhD and Bhavit Vora, MS

Tuberculosis as of last year surpassed AIDS as the leading cause of infectious disease deaths in the world, yet there have been no new drugs or more effective vaccines developed in more than four decades. This is potentially changing with collaborative partnerships involving non-profits, university scientists, government and philanthropic financing, and pharmaceutical companies. Yet the attempts to develop new therapies for tuberculosis are not without critiques including whether money is better spent on single diseases rather than broader public health initiatives, whether enough is known about the tuberculosis bacterium to go ahead with clinical trials of new drug and vaccine candidates, and whether low-income countries affected by the disease should be leading these collaborations. These debates will be discussed in this talk, with the aim not to answer any of them definitively, but to elucidate what might be at stake in these collaborations and in the longstanding efforts to mitigate tuberculosis globally.

Alpha Eta Mu Beta (AEMB), the National Biomedical Engineering Honor Society, is committed to promoting ethics in the field of biomedical engineering. This year, AEMB is honored to host Dr. Susan Craddock from the University of Minnesota. Dr. Craddock's research focuses on social and political factors shaping the experience and patterns of, as well as responses to, infectious diseases. She has published on access to AIDS drugs, noncommercial clinical trials, and the roles of poverty, gender, and race on public health responses to tuberculosis. Her forthcoming book, Compound Solutions: Pharmaceutical Alternatives for Global Health, is on collaborative efforts to produce new tuberculosis vaccines and drugs for the first time in decades.
Alpha Eta Mu Beta

Saturday, October 8

9:00 am–10:00 am Room 200A/CC

**Mentoring for INnovative Design Solutions (MINDS) Workshop**

**Session Co-chairs:** Teresa A. Murray, PhD, Alicia Fernandez-Fernandez, PhD, DPT, Bhavit Vora, MS, Justin Huckaby, BS, Morgan Elliott, BS, David Wollson, BS, Marcia A. Pool, PhD, Kerri A. Green, MS and Dominic E. Nathan PhD.

Participation in this workshop is by invitation after successfully competing for a spot on a design team to address this year’s design/research topic (please see: [http://www.alphaetamubeta.org/](http://www.alphaetamubeta.org/) for application instructions). Students will work in teams of 4 based on similar interests. Each team will have a mentor who will assist the team in creating a potentially marketable innovation. The mentor will help students incorporate key design considerations, including (i) market considerations for commercialization, (ii) design development and testing, (iii) quality control, (iv) regulatory strategy, and (v) intellectual property protection. After the workshop, students will meet virtually (e.g., via Skype) for up to 8 months to further refine their innovation. They will also be required to produce a more extensive presentation of their product, such as a video for a Kickstarter campaign, or a PowerPoint presentation for a group of potential investors. We will alert participants about opportunities for design contests, investment, and grant programs to further promote and develop their innovations. This program requires an 8 month commitment.

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**Friday, October 7**

8:00 am–9:30 am Room 200J/CC

**Whitaker International Program: Funding Opportunity for Young Biomedical Engineers**

The Whitaker International Program, founded in 2005 provides funding to emerging U.S.-based leaders in biomedical engineering to conduct a study and/or research project, with the underlying objective of building international bridges. Grant projects - including research, coursework, public policy work - are intended to enhance both the recipient's career and the BME field. The goal of the Whitaker Program is to assist the development of professional leaders who are not only superb scientists, but who will advance the profession through an international outlook. The Whitaker Program has two sub-programs: Fellows and Scholars Program, and the Summer Program. For more information, including program details, the online application and deadlines, visit: [http://www.whitaker.org](http://www.whitaker.org).

**Chair:** Amie Schaefer

*Program Officer, Whitaker International Program*

*Institute of International Education*

**Joseph Yu**

*Whitaker International Fellow, 2013*

*Host Institution: Imperial College London, UK*

**Topic: Comprehensive Training in Cardiovascular Research and Biomedical Engineering Entrepreneurship**

**Brandan Walters**

*Whitaker International Fellow, 2014*

*Host Institution: Eberhard Karls University of Tubingen, Germany*

**Topic: Quantifiably Controlling Mesenchymal Stem Cell Morphology by Application of Tuned Cyclic Strain and the Effects of These Changes on Smooth Muscle Cell Differentiation**

**Erin Coonahan**

*Whitaker International Fellow, 2013*

*Host Institution: Engineering World Health, Honduras*

**Topic: Technician Training Programs to Improve Access to Healthcare in Honduras**

**Colin Hisey**

*Whitaker International Fellow, 2015*

*Host Institution: University of Navarra, Spain*

**Topic: A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures**

**Alisha Geldert**

*Whitaker International Fellow, 2015*

*Host Institution: National University of Singapore*

**Topic: Investigation of Aptamer-based Sensing for Malaria Detection**
Cellular and Molecular Bioengineering

Congratulations the 2016 CMBE Young Innovators!
September 2016 issue, edited by Tejai Desai and Michael King

Craig Duvall
Vanderbilt Univ.

Stacey Finley
Univ. Southern California

Gregory Hudalla
Univ. Florida

Steven Jay
Univ. Maryland

Christopher Jewell
Univ. Maryland

Xiaojun Lance Lian
Penn State Univ.

Ting Lu
Univ. Illinois Urbana-Champaign

Minglin Ma
Cornell Univ.

Erkin Seker
Univ. California Davis

Kandice Tanner
National Cancer Institute

Kathryn Whitehead
Carnegie Mellon Univ.

CMBE 2016

See the Young Innovators present their work on Friday, October 7, 2016 at 1:45 and 4:00 pm!

- Become a 2017 CMBE Young Innovator! Next competition is underway.
- Accepted authors will be invited to present their work in a special two-part platform session at the 2017 BMES Annual Meeting.
- To be eligible, candidates must hold a position at the Assistant Professor level or equivalent. BMES non-members are eligible and welcome.
- Self nominations should include manuscript title with 200-word abstract, and a 2-page NIH-style biosketch, emailed to mike.king@cornell.edu.

Key Dates for 2017 Young Innovators issue:
Nomination Deadline: November 4, 2016
Abstract Acceptance: December 9, 2016
Manuscript Submission: February 10, 2017
Print Publication: September 2017
The Society takes great pleasure in honoring and recognizing the significant accomplishments and contributions its members have made in the diverse field of Biomedical Engineering.

On behalf of the Awards Committee we would like to thank all the members who submitted nominations and provided letters of support for all award nominees.

Congratulations to the following Award Winners:

**The Wallace H. Coulter Award for Healthcare Innovation**
*Presented at Thursday morning plenary session at 10:15 am*

Omar Ishrak, PhD
Medtronic

Robert A. Pritzker Distinguished Lecture Award
*Presented at Thursday evening plenary session at 5:00 pm*

Nicholas A. Peppas, ScD
University of Texas at Austin

Rita Schaffer Young Investigator Award
*Presented at Saturday morning plenary session at 10:30 am*

Jennifer Munson, PhD
University of Virginia

Diversity Lecture Award
*Presented at Saturday morning plenary session at 10:30 am*

Srinivas Sridhar, PhD
Northeastern University

Innovation and Career Development Awards
*Presented Thursday at Engineering Low-Cost Solutions to Address Health Care Disparities session at 3:15 pm*

Angela Alexander-Bryant, PhD
Clemson University

Salma Ayoub
University of Texas at Austin

Lisa Cervia
Duke University

Paulette Foster
North Carolina A & T State University

Ruby Huynh
Catholic University of America

Juan Jimenez, PhD
University of Massachusetts

Maritza Jimenez
University of Pittsburgh

Meryem Pehlivaner
Northeastern University

Faisal Reza, PhD
Yale University

Evan Scott, PhD
Northwestern University

Woon-Hong Yeo, PhD
Virginia Commonwealth University

**BMES Extended Abstracts: Design and Research Awards**
*Presented at Friday morning plenary session at 10:15 am*

**Graduate Students**

Ali Bakhshinejad
University of Wisconsin- Milwaukee

Fidel Hernandez
Stanford University

Randall Meyer
Johns Hopkins University

Lei Wang
Colorado State University

Yang Zhu
McGowan Institute for Regenerative Medicine

**Undergraduate Students**

April Joy Aralar
George Mason University

Adam Berger
University of Maryland

Kevin Cyr
Vanderbilt University

Jack Dischler
Wayne State University

Nikan Namiri
University of California, Los Angeles

Erica Schwarz
Johns Hopkins University

Shania Shaji
Widener University

**BMES Student Chapter Awards**
*Presented at Saturday morning plenary session at 10:30 am*

2016 Outstanding Achievement Award

BMES Student Chapter at Virginia Tech/ Wake Forest University

2016 Commendable Achievement Award

BMES Student Chapter at Clemson University

2016 Outstanding Mentoring Program Award

BMES Student Chapter at University of Illinois, Urbana-Champaign

2016 Outstanding Chapter-Industry Achievement Award

BMES Student Chapter at The Ohio State University

2015 Fleetest Feet Award

BMES Student Chapter Virginia Tech/Wake Forest—46,680 miles
Honorable Mentions
BMES Student Chapter at Johns Hopkins University
BMES Student Chapter at San Jose State University
BMES Student Chapter at University of Southern California

BMES Journal Paper Awards
Presented at Friday morning plenary session at 10:15am/ Main Auditorium, Level I

Annals of Biomedical Engineering (ABME)

Most Downloaded
Bethany Rowson, Steven Rowson, Stefan M. Duma

Most Cited
Biologic Scaffolds for Regenerative Medicine: Mechanisms of In vivo Remodeling.
Ricardo Londono, Stephen F. Badylak

Vascularization in Bone Tissue Engineering Constructs.
Ángel E. Mercado-Pagán, Alexander M. Stahl, Yaser Shanjani, Yunzhi Yang

Cardiovascular Engineering and Technology

Most Downloaded
The 'Sphere': A Dedicated Bifurcation Aneurysm Flow-Diverter Device.
Thomas Peach, J. Frederick Cornhill, Anh Nguyen, Howard Riina, and Yiannis Ventikos

Most Cited
Biodegradable Stents: Biomechanics Modeling Challenges and Opportunities.
James E. Moore Jr., Joao S. Soares, Kumbakanon R Rajagopal

Cellular and Molecular Bioengineering

Most Downloaded
Anna-Lena Cost, Pia Ringer, Anna Chrostek-Grashoff, and Carsten Grashoff

Editor’s Choice Award
Probing the Biophysical Properties of Primary Breast Tumor-Derived Fibroblasts.
Turi A. Alcocer, Francois Bordeleau, Shawn P. Carey, Marsha C. Lampi, Daniel R. Kowal, Sahana Somasegar, Sonal Varma, Sandra J. Shin, Cynthia A. Reinhart-King
Note: the Editor-in-Chief Michael King recused himself from this year’s Editor’s Choice selection process.

CONGRATULATIONS!
BMES 2016 CLASS OF FELLOWS

BMES Fellow status is a distinguished honor awarded to members with outstanding qualifications and experience, who have demonstrated exceptional achievement in the field of biomedical engineering. Recipients have also maintained a consistent record of membership and participation within the Society.

FELLOWS RECIPIENTS

Stelios Andreadis, PhD
Bahman Anvar, PhD
Jason H. T. Bates, PhD, DSc
John P. Fisher, PhD
Ali Khademhosseini, PhD
Sanjay Kumar, MD, PhD
Elizabeth G. Loboa, PhD
Angélique Louie, PhD
Béla Suki, PhD

Fellows will receive Awards at the Pritzker Lecture on Thursday, October 8, 2016 at 5:00pm.
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<th>Affiliation</th>
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<td>Amina Qutub</td>
<td>Rice University</td>
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<td>Casim Sarkar</td>
<td>University of Minnesota</td>
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<td>Biomaterials</td>
<td>Shelly Peyton</td>
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<td>Brendan Harley</td>
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<td>The City College of New York</td>
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<td>Translational Biomedical Engineering</td>
<td>Roger Kamm</td>
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<td>Rashid Bashir</td>
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Minneapolis | BMES 2016
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Respiratory Bioengineering
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Hui Wei
David Zaharoff
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Milad Akhlaghi Bouzan
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Janet Barzilta
Jason Bates
Dwight Bronson
Ashley Brown
Daniel Cavanagh
Jun Cheng
Hansang Cho
Lesley Chow
Olivia Coiado
Brad Culbreth
Ranjan Dash
Brian Dean
Tara Deans
Jaydip Desai
Anthony Dickherber
Paul Fagette
Amir Farnoud
George Fercana
Ann Foley
Peter Galie
Joan Greve
Vivek Gupta
Ian Hale
Connie Hall
Melinda Harman
Rebecca Heise
Kazunori Hoshino
Jeffrey Jacot
Devina Jaiswal
Karim Jensen
Caroline Jones
Yonghyun Kim
Vipuil Kishore
Pamela Kreeger
Pantrika Krisanarungson
JeoungSoo Lee
Song Lou
Jason Luck
Joseph Martel-Foley
Megan McClean
Mary Beth Monroe
Ashwin Nair
Drishya Nair
Grace O’Connell
Kidong Park
Rui Pereira
Vipul Raikar
Harcharan Ranu
Jorge Rodriguez
Karl Schilke
Steven Schreiner
Aleksander Skardal
Paul Sundaram
Aby Thyparambil
William D Wagner
Siqi Wang
Xuefeng Wei
Jeffrey Willey
Tong Ye
Lufang Zhou
## THURSDAY’S HIGHLIGHTS

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<tr>
<th>Platform Sessions-Thurs-1</th>
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<tr>
<td><strong>8:00 am–9:30 am</strong></td>
<td><strong>1:00 pm–2:30 pm</strong></td>
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<td>Convention Center</td>
<td>Convention Center</td>
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<table>
<thead>
<tr>
<th><strong>9:00 am–10:00 am</strong></th>
<th><strong>Meet the Expert: NIH Funding: Meet Program Directors, Reviewers, and Awardees</strong></th>
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<tbody>
<tr>
<td>Room 201</td>
<td>Room 204</td>
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### Exhibit Hall Open

<table>
<thead>
<tr>
<th><strong>9:30 am–5:00 pm</strong></th>
<th><strong>Special Session: International Symposium on Biomedical Engineering</strong></th>
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<tbody>
<tr>
<td>Exhibit Hall</td>
<td>Room 208CD</td>
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### Poster Session

<table>
<thead>
<tr>
<th><strong>9:30 am–5:00 pm</strong></th>
<th><strong>Special Session: Developing Best Practices for Graduate Training in Biomedical Innovation</strong></th>
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</thead>
<tbody>
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<td>Room 102E</td>
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### Poster Viewing with Authors & Refreshment Break

<table>
<thead>
<tr>
<th><strong>2:30 pm–3:15 pm</strong></th>
<th><strong>Plenary Session: Robert A. Pritzker Distinguished Lecture</strong></th>
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<tbody>
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<td>Exhibit Hall</td>
<td>Ballroom BC</td>
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### Plenary Session

<table>
<thead>
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<th><strong>Hosted Receptions—Minneapolis Hilton</strong></th>
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<tbody>
<tr>
<td>Auditorium</td>
<td>Ballroom BC</td>
</tr>
<tr>
<td><strong>State of the Society</strong></td>
<td><strong>Designing the Next Generation of Intelligent Biomaterials and Hydrogels: Molecular Recognition and Advanced Protein and Cell Delivery</strong></td>
</tr>
<tr>
<td>Rich Hart, PhD</td>
<td>Nicholas Peppas, ScD</td>
</tr>
<tr>
<td>Additional Ticket Purchase Required</td>
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### Celebration of Minorities in BME Luncheon

<table>
<thead>
<tr>
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<th><strong>Industry Session: Special Industry Topics</strong></th>
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<tbody>
<tr>
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### Industry Session: Technology Transfer Pitches and Networking

<table>
<thead>
<tr>
<th><strong>12:00 noon–2:00 pm</strong></th>
<th><strong>Special Session: Engineering Low-Cost Solutions to Address Health Care Disparities</strong></th>
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<tbody>
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### Plenary Session: Robert A. Pritzker Distinguished Lecture

<table>
<thead>
<tr>
<th><strong>5:00 pm–6:00 pm</strong></th>
<th><strong>Hosted Receptions—Minneapolis Hilton</strong></th>
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<tbody>
<tr>
<td>Ballroom BC</td>
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</tbody>
</table>
**Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1**

<table>
<thead>
<tr>
<th>Track: Biomechanics, Cellular and Molecular Bioengineering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Nucleus and Cytoskeleton in Mechanobiology</strong></td>
</tr>
<tr>
<td>Chairs: Jan Lammerding, Venkat Maruthamuthu</td>
</tr>
<tr>
<td><strong>8:00 am</strong></td>
</tr>
<tr>
<td>Activating the Nuclear Piston Mechanism to Generate Intracellular Pressure During 3D Tumor Cell Migration—<strong>INVITED</strong></td>
</tr>
<tr>
<td>Ryan Petrie¹</td>
</tr>
<tr>
<td>¹Drexel University, Philadelphia, PA</td>
</tr>
<tr>
<td><strong>8:15 am</strong></td>
</tr>
<tr>
<td>LINC Complex Disruption Enhances Nuclear Deformability and Cell Transit Through Narrow Constrictions</td>
</tr>
<tr>
<td>Gregory Fedorchak¹, Jineet Patel¹, Patricia Davidson², and Jan Lammerding¹</td>
</tr>
<tr>
<td>¹Cornell University, Ithaca, NY, ²Institut Curie, Paris, France</td>
</tr>
<tr>
<td><strong>8:30 am</strong></td>
</tr>
<tr>
<td>As the Beating Heart Stiffens in Development, So Does the Nuclear Lamina</td>
</tr>
<tr>
<td>Sangkyun Cho¹, Stephanie Majkut¹, Kenneth Vogel¹, Amal Abbas¹, Manorama Tewari¹, Jerome Irianto¹, Andrea Liu¹, Sam Safran¹, and Dennis Discher¹</td>
</tr>
<tr>
<td>¹University of Pennsylvania, Philadelphia, PA, ²Weizmann Institute, Rehovot, Israel</td>
</tr>
<tr>
<td><strong>8:45 am</strong></td>
</tr>
<tr>
<td>Regulation of Single Stress Fiber Mechanics by Cell Geometry and Actin Network Architecture</td>
</tr>
<tr>
<td>Elena Kassianidou¹, Christoph Brand², Ulrich Schwarz², and Sanjay Kumar¹</td>
</tr>
<tr>
<td>¹UC Berkeley, Berkeley, CA, ²Institute for Theoretical Physics and BioQuant, Heidelberg University, Heidelberg, Germany</td>
</tr>
<tr>
<td><strong>9:00 am</strong></td>
</tr>
<tr>
<td>Force-history Dependence and Reinforcement of Actin Filaments at the Single Molecular Level</td>
</tr>
<tr>
<td>Hyunjung Lee¹, Shoichiro Ono², Suzanne Eskin¹, Cheng Zhu¹, and Larry McIntire¹</td>
</tr>
<tr>
<td>¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA</td>
</tr>
<tr>
<td><strong>9:15 am</strong></td>
</tr>
<tr>
<td>The Role of Cytoskeleton and Ion Channels In Cell Decision-Making Under Confinement</td>
</tr>
<tr>
<td>Alexandros Afthinos¹, Runchen Zhao¹, and Konstantinos Konstantopoulos¹</td>
</tr>
<tr>
<td>¹The Johns Hopkins University, Baltimore, MD</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Track: Cancer Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emerging Technologies for Cancer Treatment</strong></td>
</tr>
<tr>
<td>Chairs: Tony Dickherber, Keyue Shen</td>
</tr>
<tr>
<td><strong>8:00 am</strong></td>
</tr>
<tr>
<td>Toward Targeting the Physical Hallmarks of Tumors with Pulsed Electric Field Ablation Therapy—<strong>INVITED</strong></td>
</tr>
<tr>
<td>Scott Verbridge¹, Jill Ivey¹, Eduardo Latouche¹, Akanksha Kanitkar¹, Mike Sano², Zhi Sheng³, John Rosmeisl¹, and Rafael Davalos¹</td>
</tr>
<tr>
<td>¹Virginia Tech, Blacksburg, VA, ²Stanford University, Stanford, CA, ³Virginia Tech Carilion Research Institute, Roanoke, VA</td>
</tr>
<tr>
<td><strong>8:15 am</strong></td>
</tr>
<tr>
<td>Prussian Blue Nanoparticle-based Photothermal Therapy Combined with Checkpoint Inhibition for Photothermal Immunotherapy of Neuroblastoma</td>
</tr>
<tr>
<td>Juliana Cano-Meija¹, Elizabeth Sweeney¹, Rachel Burga¹, Catherine Bollard¹, Anthony Sandler¹, John Fisher², C. Russell Y. Cruz¹, and Rohan Fernandes³</td>
</tr>
<tr>
<td>¹Children’s National Health System, Washington, DC, ²University of Maryland, College Park, MD, ³Children’s National Health System, Washington, DC</td>
</tr>
<tr>
<td><strong>8:30 am</strong></td>
</tr>
<tr>
<td>Microporous Scaffolds For Early Detection of Circulating Pancreatic Cancer Cells</td>
</tr>
<tr>
<td>Grace Bushnell¹, Lidong Wang¹, Shreyas Rao², Rachel Dudek¹, Yining Zhang¹, Robert Oakes¹, Jacqueline Jeruss¹, Diane Simeone¹, and Lonnie Shea¹</td>
</tr>
<tr>
<td>¹University of Michigan, Ann Arbor, MI, ²University of Alabama, Tuscaloosa, AL</td>
</tr>
<tr>
<td><strong>8:45 am</strong></td>
</tr>
<tr>
<td>Mapping Tumor Cell Drug Response as a Function of Matrix Context Using Combinatorial Cell Microarrays</td>
</tr>
<tr>
<td>Kerim Kaylan¹, Stefan Gentile¹, Lauren Milling¹, Kaustubh Bhinge², Farhad Kosari², and Gregory Underhill¹</td>
</tr>
<tr>
<td>¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Mayo Clinic, Rochester, MN</td>
</tr>
<tr>
<td><strong>9:00 am</strong></td>
</tr>
<tr>
<td>3D In Vitro Platform to Isolate Dormancy-Capable Cancer Cells</td>
</tr>
<tr>
<td>Julian Preciado¹, Eduardo Reategui¹, Emil Lou¹, Samira Azarin¹, and Alptekin Aksan¹</td>
</tr>
<tr>
<td>¹University of Minnesota, Minneapolis, MN</td>
</tr>
<tr>
<td><strong>9:15 am</strong></td>
</tr>
<tr>
<td>A Mathematical Framework for Ultra-sensitive Detection of Cancer Using Activity-Based Biomarkers</td>
</tr>
<tr>
<td>Gabe Kwong¹</td>
</tr>
<tr>
<td>¹Georgia Tech &amp; Emory, Atlanta, GA</td>
</tr>
</tbody>
</table>
Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

**OP-Thurs-1-3**

**Tracks: Biomechanics, Cardiovascular Engineering**

**Cardiovascular Biomechanics I**

**Chairs:** Ellie Rahbar, Saravan Kumar Shanmugavelayudam

**8:00 am**

*Hemodynamic Reflex Compensation in Acute Infarction: Implications for Ventricular Remodeling*

Colleen M. Witzenburg¹, Wade Zhang¹, Brooke T. Sutherland¹, and Jeffrey W. Holmes¹

¹University of Virginia, Charlottesville, VA

**8:15 am**

*Pulmonary Artery Stiffening is Evident by Changes in Nonlinear Mechanical Properties in Canine PAH*

Mark Golob¹, Gregory Wolf¹, Omid Forouzan¹, Ashley Mulchrone¹, Heidi Kellihan¹, Melissa Bates², and Naomi Chesler¹

¹University of Wisconsin-Madison, Madison, WI, ²University of Iowa, Iowa City, IA

**8:30 am**

*Hydrostatic Stress Regulates Tissue Compaction, Polarity, and Matrix Stiffness in the Developing Atrioventricular Valve*

David Bassen¹, Rishabh Singh¹, Russell Gould¹, Philip Buskohl¹, and Jonathan Butler¹

¹Cornell University, Ithaca, NY

**8:45 am**

*Tsai-Hill Maximum-Work Theory: An Anisotropic Failure Criterion For Fibrous Biological Tissues*

Christopher Korenczuk¹, Lauren Votava¹, Rohit Dhume¹, and Victor Barocas¹

¹University of Minnesota, Minneapolis, MN

**9:00 am**

*Adaptive Remodeling of the Right Ventricle Myocardium in Response to Pulmonary Hypertension: Towards Physical Understanding and Prediction*

Reza Avazmohammadi¹ and Michael Sacks¹

¹University of Texas at Austin, Austin, TX

**9:15 am**

*Do Pressure-Volume Loops Accurately Measure Heart Tissue Stiffness? A Comparison with Biaxial Tensile Testing*

Rachel Childers¹², Aaron J. Trask¹², Jun Liu¹, Pamela A. Lucchesi³, and Keith J. Gooch¹

¹The Ohio State University, Columbus, OH, ²Nationwide Children’s Hospital Research Institute, Columbus, OH, ³The Commonwealth Medical College, Scranton, PA

**OP-Thurs-1-4**

**Room 102AB**

**Track: Tissue Engineering**

**Bioreactor Systems for Tissue Engineering**

**Chairs:** Roche deGuzman, Harini Sundararaghavan

**8:00 am**

*Tissue Engineering Bioreactors for Regenerative Medicine and Study of Disease—INVITED*

Gordana Vunjak-Novakovic¹, Kacey Ronaldson¹, Sarindr Bhumiratana¹, and Keith Yeager¹

¹Columbia University, New York, NY, ²RepBone, New York, NY

**8:30 am**

*Ex Vivo Arterial Culture for Assessment of Compliance-Induced Intimal Hyperplasia*

Diaz-Rodriguez¹, Jonathan Kulwatno¹, Juan Felipe Diaz Quiroz¹, Alysha Kishan², Allison Post², Elizabeth Cosgriff-Hernandez², and Mariah Hahn¹

¹Rensselaer Polytechnic Institute, Troy, NY, ²Texas A&M University, College Station, TX

**8:45 am**

*A Study of Matrix Remodeling in Aortic Heart Valve Cusps in Response to Tunable Biaxial Cyclic Stretch*

Ying Lei¹, Shirin Masjedi¹, and Zannatul Ferdous¹

¹The University of Tennessee, Knoxville, Knoxville, TN

**9:00 am**

*Cardiac Valve Bioreactor Capable of Physiological Conditioning*

Brandon Tefft¹, Daniel Spoon¹, Ryan Hennessy¹, Nicholas Stoyles¹, Melissa Young¹, Soumen Jana¹, Dan Dragomir-Daescu¹, Robert Simari², and Amir Lerman¹

¹Mayo Clinic, Rochester, MN, ²University of Kansas Medical Center, Kansas City, KS

**9:15 am**

*Tissue Engineered Tendon Grafts using Oscillatory Mechanostimulation*

Zachary Mussett¹, Mary E. Hoover¹, and Vassilios Sikavitsas¹

¹University of Oklahoma, Norman, OK

**OP-Thurs-1-5**

**Room 102C**

**Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering**

**Musculoskeletal Tissue Engineering**

**Chairs:** Elizabeth Loboa, Henry Donahue

**8:00 am**

*Strategies for Functional Tissue Engineering of Articular Cartilage—INVITED*

Clark Hung¹, Andrea Tan¹, Brendan Roach¹, Adam Nover¹, Alex Cigan¹, Robert Nims¹, Kacey Marra², and James Cook³

¹Columbia University, New York, NY, ²University of Pittsburgh, Pittsburgh, PA, ³University of Missouri, Columbia, MO
Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

8:30 am
A Continuous Pore Size Gradient PLLA Scaffold for Osteochondral Regeneration
Riccardo Gottardi¹, Gioacchino Conoscenti², Peter Alexander¹, Paul Manner³, Vincenzo La Carrubba², Valerio Brucato², and Rocky Tuan¹
¹University of Pittsburgh, Pittsburgh, PA, ²Università degli Studi di Palermo, Palermo, Italy, ³University of Washington, Seattle, WA

8:45 am
In Situ Tissue Regeneration Via Robust, Bio-adhesive, and Cell-Infiltrating Supramolecular Gelatin Hydrogels
Liming Bian¹, Qian Feng¹, and Kongchang Wei¹
¹Chinese University of Hong Kong, Shatin, Hong Kong

9:00 am
Microfluidic Flow Array Printing for Engineered IVD and Musculo-skeletal Tissues
David Ede¹
¹University of Utah, Salt Lake City, UT

9:15 am
Magnetic Sorting Offers Rapid, High-Throughput Isolation of ALPL+ Cells from Liposapirate
Bryan Sutermaster¹ and Eric Darling¹
¹Brown University, Providence, RI

OP-Thurs-1-6 Room 101A
Track: Cellular and Molecular Bioengineering

Molecular and Cellular ImmunoEngineering

Chairs: Jai Rudra, Kyung-Ho Roh

8:00 am
Biomaterials-Based Immune Therapies for Treating Inflammation—INVITED
Carolina Mora Solano¹, Yi Wen², and Joel Collier²
¹University of Chicago, Chicago, IL, ²Duke University, Durham, NC

8:15 am
Innate Immune Strategies for Combating Antibiotic Resistant S. aureus Infection—INVITED
Scott Simon¹
¹UC Davis, Davis, CA

8:30 am
Two-stage Lymph Node Drug Delivery System Based on Differential Rates of Oxanorbornadiene-mediated Drug Tethering and Release from Thiolated Nanoparticles—INVITED
Alex Schudel¹, Cody Higginson¹, M.G. Finn¹, and Susan Thomas¹
¹Georgia Institute of Technology, Atlanta, GA

8:45 am
Biomaterials-based Ex Vivo Engineered Immune Organoids for Controlled Differentiation of B Cells
Alberto Purwada¹ and Ankur Singh¹
¹Cornell University, Ithaca, NY

9:00 am
Probing the Roles of Neutrophil Extracellular Trap Components with Synthetic DNA-Histone Structures
Cameron Louttit¹, Priyan Weerappulī¹, Taisuke Kojima¹, Midori Maeda¹, Cameron Yamanishi¹, Shuichi Takayama¹, and James Moon¹
¹University of Michigan, Ann Arbor, MI, ²Wayne State University, Detroit, MI

9:15 am
Engineered T Regulatory Cells (Tregs) as a Multiple Sclerosis Therapeutic
Elissa Leonard¹ and Jennifer Maynard¹
¹University of Texas at Austin, Austin, TX

OP-Thurs-1-7 Room 101B
Tracks: Cellular and Molecular Bioengineering, Nano and Micro Technologies

Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)

Chairs: Caroline Jones, Noel Dahl

8:00 am
Ultrasensitive Detection of Secreted Proteins from Single Cells Using Chemically-Amplified Quantum Dots
Vanessa Herrera¹, Thuy Luu¹, Robert Gutierrez¹, Maha Rahim¹, Frances McWhorter¹, Wendy Liu¹, and Jered Haun¹
¹University of California, Irvine, Irvine, CA

8:15 am
µFLISA: A New Experimental and Computational Platform for Analysis of Dynamic Secretomes to Identify Precise Secretory Signatures of Stem Cell Mediated Cardioprotection
Kshitiz Kz¹, David Ellison², Yasir Suhail², Junaid Afzal², Laura Woo², and Andre Levchenko¹
¹Yale University, West Haven, CT, ²Johns Hopkins University, Baltimore, MD

8:30 am
A Multiplexed Digital Microfluidic Dispenser for Quantitative Nanoliter Droplet Analysis
Jinzheng Fan¹, Baqing Li², Fernando Villarreal¹, Brent Weyers², Cheemeng Tan¹, and Tingrui Pan¹
¹University of Science and Technology of China, Hefei, China, ²University of Science and Technology of China, Hefei, China, People’s Republic of

8:45 am
Capillary Electrophoresis Coupled with Micro Free Flow Electrophoresis for High Speed Comprehensive Two-Dimensional Analysis of Peptides
Alexander Johnson¹ and Michael Bowser¹
¹University of Minnesota, Minneapolis, MN

9:00 am
Si Chen¹ and P Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Champaign, IL
9:15 am
Click Chemistry-Based DNA Labeling of Cells for Barcoding Applications
Stefan Gentile1 and Gregory Underhill1
1University of Illinois at Urbana-Champaign, Urbana, IL

8:00 am
Tendon Injuries: Degeneration and Impaired Healing—INVITED
Nelly Andarawis-Puri1
1Cornell University, Ithaca, NY

8:30 am
A Nociceptive Role for Integrin Signaling from Mechanical Injury of Ligaments
Sijia Zhang1, Jasmine Lee1, and Beth Winkelstein1
1University of Pennsylvania, Philadelphia, PA

8:45 am
Characterization of Rodent Gait in Two Models of Osteoarthritic Pain
Brittany Jacobs1, Katherine Dunnigan1, Margaret Pires-Fernandes1, and Kyle Allen1
1University of Florida, Gainesville, FL

9:00 am
Visualization of Cell Lineage and Proliferation on the Mineralizing Surface of Mechanically Loaded Tibias
Heather Zannit1 and Matthew Silva1
1Washington University in St. Louis, Saint Louis, MO

9:15 am
Simulated Microgravity Plus Immobilization Exacerbates Sarcopenia but not Osteopenia
Toni Speacht1, Andrew Krause1, Jennifer Steiner1, Charles Lang1, and Heny Donahue2
1Penn State, Hershey, PA, 2Virginia Commonwealth University, Richmond, VA

8:15 am
Nitrite Regulates Mitochondrial Dynamics to Inhibit Vascular Smooth Muscle Cell Proliferation
Christopher Reyes1,2, Sruti Shiva1,2,3, Danielle Guimaraes2, and Yinna Wang2
1University of Pittsburgh, Pittsburgh, PA, 2Pittsburgh Heart, Lung and Blood Vascular Medicine Institute, Pittsburgh, PA, 3Center for Metabolism & Mitochondrial Medicine, Pittsburgh, PA

8:30 am
Hemodynamic Alterations Translate Into Distinct Cardiac Malformation Phenotypes
Madeline Midgett1 and Sandra Rugonyi1
1Oregon Health & Science University, Portland, OR

8:45 am
An In Silico Study of Hemodynamics in a Virtually Treated Growing Cerebral Aneurysm Model
Chad Hyslop1, Priya Nair1, Matthew Mortensen1,2, Jonathan Plasencia1, Justin Ryan1, Brian Chong1,2, and David Frakes1,2
1SBHSE, Arizona State University, Tempe, AZ, 2EndoVantage, LLC, Scottsdale, AZ, 3Phoenix Children’s Hospital, Phoenix, AZ, 4Mayo Clinic Hospital, Phoenix, AZ, 5ECEE, Arizona State University, Tempe, AZ

9:00 am
Minimum Wound Size for Clotting: Flowing Blood Coagulates on a Single Collagen Fiber Presenting Tissue Factor and von Willebrand Factor
Shu Zhu1, Maurizio Tomaiuolo1, and Scott Diamond1
1University of Pennsylvania, Philadelphia, PA

8:00 am
Mechanics Of Brain Tissue Measured By Cavitation Rheology
Sualyneth Galarza1, Aleksandar Mijailovic2, Nathan Birch1, Jessica Schiffman1, Alfred Crosby1, Shelly Peyton1, and Krystyn Van Vliet2
1University of Massachusetts Amherst, Amherst, MA, 2Massachusetts Institute of Technology, Cambridge, MA

8:15 am
Thiol-epoxy/maleimide Ternary Networks as Softening Substrates for Bioelectronic Medicines
Radu Reit1, Haley Abitz1, Neel Reddy1, Shelbi Parker1, Andrew Wei1, Nicole Aragon1, Milan Ho1, Aaron Wittenhiller1, Tong Kang1, and Walter Voit1
1The University of Texas at Dallas, Richardson, TX

8:30 am
Dynamic Modulation of Mechanically Tunable 3D ECM-Mimic for the Study of Dynamic Cell Response to Scaffold Mechanics
Adam Munoz1, Joseph Miller1, Atrouli Chatterjee1, and Cynthia Reinhart-King1
1Cornell University, Ithaca, NY
8:45 am
Hyaluronic Acid-Based Hydrogels with Simultaneously Tunable Mechanical & Bioactive Properties
Madison Godesky1 and David Shreiber2
1Rutgers, The State University of New Jersey, New York, NY, 2Rutgers, The State University of New Jersey, Piscataway, NJ

9:00 am
Bio-Orthogonally Crosslinked, Engineered Protein Hydrogels with Tunable Mechanics and Biochemistry
Christopher Madl1, Lily Katz1, and Sarah Heilshorn1
1Stanford University, Stanford, CA

9:15 am
Viscoelastic Effect of Hydrogel Regulates Epithelial Morphogenesis
Yuan Yuan1, Kalyanaraman Vaidyanathan1, and Debanjan Sarkar1
1University at Buffalo, Buffalo, NY

* Biomaterials Track sponsored by

OP-Thurs-1-11 Room 200E
Tracks: Cardiovascular Engineering, Device Technologies and Biomedical Robotics

Cardiovascular Devices I
Chairs: Olivia Coiado, Lola Brown

8:00 am
Using Vagus Nerve Stimulation To Treat Hypertension And Hypertension-Induced Heart Disease
Elizabeth Annoni1, Xueyi Xie1, Steven Lee1, Kanchan Kulkarni1, Imad Libbous2, Bruce KenKnight2, John Osborn1, and Elena Tolkacheva1
1University of Minnesota, Minneapolis, MN, 2Cyberonics Inc., Houston, TX

8:15 am
Improving Cardiac Transplantation Using an Ex Vivo Perfusion Model and Pharmacological Posttreatment
Maria Seewald1, Erik Gaasedelen1, Tinen Iles1, Lars Mattison1, Alexander Mattson1, Megan Schmidt1, and Paul laizzo1
1University of Minnesota, Minneapolis, MN

8:30 am
A Microwave-assisted Wireless Passive Stimulator of Cardiac Cells
Shiyi Liu1, Ali Navaei1, Mehdi Nikkhah1, and Junseok Chae1
1Arizona State University, Tempe, AZ

8:45 am
Myocardial Perfusion During Left Ventricular Assist Device Support in Normal & Heart Failure Calves
Kevin Soucy1, Dustin Phillips1, Guruprasad Giridharan1, Michael Sobieski1, Sumanth Prabhu1, Mark Slaughter1, and Steven Koenig1
1University of Louisville, Louisville, KY, 2University of Alabama at Birmingham, Birmingham, AL

9:00 am
Novel Nanomatrix Reduces Inflammation in Dynamic Conditions In Vitro and Dilates Arteries Ex Vivo
Grant Alexander1, Jeremy Vines1, Patrick Hwang1, Teayoun Kim1, Jeong-a Kim1, Brigitta Brott1, Young-Sup Yoon2, and Ho-Wook Jun1
1University of Alabama at Birmingham, Birmingham, AL, 2Emory University, Atlanta, GA

9:15 am
Detachable Small-scale Glass Microelectrode to Measure Transmembrane Potential in Contracting Hearts
Angel Moreno1, Mladen Barbic2, and Matthew Kay1
1The George Washington University, Washington, DC, 2The Howard Hughes Medical Institute, Janelia Research Campus, Ashburn, VA

OP-Thurs-1-12 Room 200F
Track: Device Technologies and Biomedical Robotics

Biosensors
Chairs: Daniel Ratner, Jeffrey LaBelle

8:00 am
Biosensor Array for Highly Sensitive and Rapid Detection of Wound Bacteria
Roya Sheybani1 and Anita Shukla1
1Brown University, Providence, RI

8:15 am
Capillary-Driven Fluidic Networks for Blood Typing via Silicon Photonic Biosensors
Shon Schmidt1, Alexander Wende1, Jonas Flueckiger2, Lukas Chróstowski2, and Daniel Ratner1
1University of Washington, Seattle, WA, 2University of British Columbia, Vancouver, BC, Canada

8:30 am
Development of an Iris Image Based Noninvasive Physiological Glucose Sensor: A Preliminary Clinical Trial
Niraj K. Gupta1 and Brent D. Cameron1
1University of Toledo, Toledo, OH

8:45 am
Real-Time Detection of Insulin Surrogate Markers within Physiomimetic Islet Microsystems
Giovanni Lenguito1, Jonathan Witz2, Alejandro Caicedo2, and Ashutosh Agarwal2
1University of Miami, Miami, FL

9:00 am
Novel Algorithm For Multi-marker Detection In Electrochemical Impedance Spectroscopy
Chi Lin1, David Probst1, Lindsey Rider1, and Jeffrey LaBelle1
1Arizona State University, Tempe, AZ
9:15 am
Ultrasonic Transducer-Guided Electro-chemical Impedance Spectroscopy to Assess Lipid-Laden Plaques
Jianguo Ma1, Yuan Luo2, Rene Packard1, Teng Ma3, Yichen Ding4, Parinaz Abiri5, Yu-Chong Tai6, Qifa Zhou2, Kirk Shung7, Rongsong Li8, and Tzung Hsiai1
1University of California, Los Angeles, Los Angeles, CA,
2California Institute of Technology, Pasadena, CA,
3University of Southern California, Los Angeles, CA

OP-Thurs-1-13 Room 200D
Track: Biomaterials*
3D Printing and Advanced Biomaterial Manufacturing

Chairs: Kyung Jae Jeong, Teja Guda

8:00 am
Design and Characterization of Functional Microscale Bicuspid Valves Fabricated in Biocompatible Hydrogels
Samantha Paulsen1, Bagrat Grigoryan1, and Jordan Miller1
1Rice University, Houston, TX

8:15 am
Dual Crosslinking System for Stabilizing Filament-based 3D Printing of Hydrogel Structures
Christopher Highley1, Liliang Ouyang2,3, Christopher Rodell1, and Jason Burdick1
1University of Pennsylvania, Philadelphia, PA,
2Tsinghua University, Beijing, China, People’s Republic of China

8:30 am
Development of a Photoresponsive Scaffold for the Induced Release of Self-Assembled Nanostructures
Nicholas Karabin1 and Evan Scott1
1Northwestern University, Evanston, IL

8:45 am
Silk Hydrogel-Based Bio-Functionalized Microfluidics
Siwei Zhao1, Ying Chen1, Benjamin Partlow1, Anne Golding1, Peter Tseng1, Jeannine Coburn1, Matthew Applegate1, Jodie Moreau1, Fiorenzo Omenetto1, and David Kaplan1
1Tufts University, Medford, MA

9:00 am
3D Printing of a Cellulized Composite for Bone Repair
Caroline Murphy1, Krishna Kolan1, Ming Leu1, and Julie Semon1
1Missouri S&T, Rolla, MO

9:15 am
3D Printing System to Fabricate Therapeutically Loaded Biopolymer Microthreads for Applications in Tissue Engineering
Meagan Carnes1, Christopher Nycz2, Jeremy Shui1, Jacquelyn Claveau1, Alex Markoski1, Richard Eberheim1, Gregory Fischer1, and George Pins1
1Worcester Polytechnic Institute, Worcester, MA

* Biomaterials Track sponsored by

ACS Biomaterials
Science & Engineering
Thursday, October 6 | 8:00 am–9:30 am | Platform Session 1

**OP-Thurs-1-15** Room 200C

**Tracks:** Biomedical Imaging and Optics, Tissue Engineering

**Imaging Techniques in Tissue Engineering**

Chairs: Paolo Decuzzi, Adam Feinberg

**8:00 am**

*In Vitro MRI and In Vivo MRE of Mesenchymally Derived TE Constructs—INVITED*

Shadi Othman¹

¹University of the Pacific, Stockton, CA

**8:30 am**

Optical Clearing Affords Whole Organ Imaging and Morphometric Analysis of Cellular and Extracellular Matrix Remodeling Using a Murine Regenerating Bladder Model

Frank Marini¹, Kyle Cowdrick¹, Mona Zarifpour¹, Christopher Booth², Harsh Patolia³, Karl-Erik Andresson¹, and George Christ¹

¹Wake Forest Institute of Regenerative Medicine, Winston-Salem, NC, NC, ²John Hopkins School of Medicine, Baltimore, MD, ³University of Virginia, Charlottesville, Charlottesville, VA

**8:45 am**

Diffuse Correlation Tomography to Accelerate Tissue-Engineering Approach for Improving Allografts

Songfeng Han¹, Joseph B Vella¹, Ashley R Proctor¹, Danielle S W Benoit¹, and Regine Choe¹

¹Northwestern University, Evanston, IL

**9:00 am**

Single-photon Emission Computed Tomography (SPECT) Assessment of an Engineered Endothelium on ePTFE Vascular Grafts

Yidi Wu¹, Bin Jiang¹, Chad Haney¹, and Guillermo Ameer¹

¹Northwestern University, Evanston, IL

**9:15 am**

Tracking Ocular Stem Cell Delivery and Tissue Regeneration with Ultra-sound and Photoacoustic Imaging

Kelsey Kubelick¹, Eric Snider¹, Heechul Yoon¹, C. Ross Ethier¹, and Stanislav Emelianov¹

¹Georgia Institute of Technology and Emory University, Atlanta, GA

**OP-Thurs-1-16** Room 200H

**Track:** Drug Delivery

**Nucleic Acid Delivery**

Chairs: Craig Duvall, Kris Dahl

**8:00 am**

Targeted Nanoparticles for Delivery Of siRNA To Sites Of Early Onset Post-Traumatic Osteoarthritis

Sean Bedingfield¹, Taylor Kavanaugh¹, Caeley Gullett¹, Thomas Werfel¹, Hongik Cho², Karen Hasty², and Craig Duvall³

¹Vanderbilt University, Nashville, TN, ²University of Tennessee, Memphis, TN

**8:15 am**

Reversal of Liver Fibrosis using L-tyrosine Polyurethane Nanoparticles Encapsulated with microRNA

Jeongenu Hyun¹, Sihyung Wang¹, Jieun Kim¹, K. Madhusudana Rao¹, Soo Yang Park¹, Ildoo Chung¹, Chang-Sik Ha¹, Sang-Woo Kim¹, Youngmi Jung¹, and Yang H. Yun²

¹Pusan National University, Busan, Korea, Republic of, ²University of Akron, Akron, OH

**8:30 am**

High Content Analysis Platform for Optimization of CRISPR-Cas9 Delivery Strategies in Human Cells

Jared Carlson-Stevermer¹, Benjamin Steyer¹, Madelyn Goedland¹, Meng Lou², Lucille Kohlenberg¹, Ryan Prestil³, and Krishanu Saha¹

¹University of Wisconsin-Madison, Madison, WI

**8:45 am**

Targeted Delivery of Brain-Penetrating Non-Viral GDNF Gene Vectors to the Striatum with MRI-guided Focused Ultrasound Reverses Neurodegeneration in a Parkinson’s Disease Model

Brian Mead¹, Namho Kim², Panagiotis Mastorakos³, Wilson Miller¹, Jung Soo Suk³, Alexander Klibanov¹, Justin Hanes³, and Richard Price¹

¹University of Virginia, Charlottesville, VA, ²Johns Hopkins University School of Medicine, Baltimore, MD

**9:00 am**

Essential Role of Endocytic Vesicles and Trafficking in Gene Delivery Via Electroporation

Lisa Cervia¹ and Fan Yuan¹

¹Duke University, Durham, NC

**9:15 am**

Nanotherapeutics for Combination Drug and Gene Therapy in Treating Glioblastoma Multiforme

Angela Alexander-Bryant¹, Michael Lynn², and Jeoung Soo Lee¹

¹Clemson University, Clemson, SC, ²Greenville Hospital System, Greenville, SC

**OP-Thurs-1-17** Room 200B

**Track:** Translational Biomedical Engineering

**Translation of Biomedical Products**

Chairs: Roger Kamm, Andrew Smith

**8:00 am**

Move Over, Mice: How Integration of Systems Biology with Organs-on-Chips May Humanize Therapeutic Development—INVITED

Linda Griffith¹

¹MIT, Cambridge, MA

**8:30 am**

Point-of-Care Biochip to Quantify CD64 Expression for Sepsis Diagnosis

Umer Hassan¹, Bobby Reddy¹, Tor Jensen², Manish Patel¹, Emilee Flaughler¹, Michael Rappleye¹, Gillian Smith¹, Zachary Price¹, Paula Guevara¹, Hiba Shahid¹, Astha Tanna¹, Tanmay Ghonge¹, and Rashid Bashir¹

¹University of Illinois at Urbana Champaign, Urbana, IL, ²Carle Foundation Hospital, Urbana, IL
8:45 am
A Stem Cell-Seeded Porous Hydrogel Patch for Treatment of Alveolar Air Leaks
Brandon Guenthart¹, Jinho Kim¹, John O’Neill¹, N. Valerio Dorrello¹, Matthew Bacchetta¹, and Gordana Vunjak-Novakovic¹
¹Columbia University, New York, NY

9:00 am
Accelerating The Formation of Micro-vascular-ture-on-a-chip with Senescent Stromal Cells
Yang Xiao¹, Chang Liu¹, Jonathan Chen¹, Jing Zhou¹, Zhuo Chen¹, Vittorio Orlandi¹, Laura Niklason¹, and Rong Fan¹
¹Yale University, New Haven, CT

9:15 am
The Development of a Thin-Filmed, Non-Invasive Tissue Perfusion Sensor To Quantify Capillary Pressure Occlusion Of Explanted Organs
Timothy O’Brien¹, Ali Roghanizad¹, Philip Jones¹, Charles Aardema¹, John Robertson¹, and Thomas Diller¹
¹Virginia Tech, Blacksburg, VA

OP-Thurs-1-18 Room 2001

Track: Respiratory Bioengineering

Computational Modeling of the Respiratory System in Health and Disease

Chairs: Tilo Winkler, David Kacska

8:00 am
A Statistical and Biophysical Model of the Young-to-Old Adult Human Lung For Predicting Function From Structure—INVITED
Merryn Tawhai¹, Mahyar Osanlouy¹, Yuwen Zhang¹, Clair King², Margaret Wilsher², David Milne³, Ching-Long Lin⁴, Eric Hoffman⁴, and Alyx Clark³
¹University of Auckland, Auckland, New Zealand, ²Auckland District Health Board, Auckland, New Zealand, ³University of Iowa, Iowa City, IA

8:15 am
A Viscoelastic Model of Alveolar and Alveolar Duct Dynamics in Bleomycin-induced Lung Injury
Bradford Smith¹, Lars Knudsen², Elena Lopez-Rodriguez², Lennart Berndt², Caroline Boden², Clemens Ruppert³, Matthias Ochs³, and Jason Bates¹
¹University of Vermont, Burlington, VT, ²Hannover Medical School, Hannover, Germany, ³Justus-Liebig-University, Giessen, Germany

8:30 am
Regional Increase in Airway Wall Thickness Could Affect Overall Bronchoconstriction and Result in Airway Hyperresponsiveness in Asthma
Tilo Winkler¹
¹Massachusetts General Hospital and Harvard Medical School, Boston, MA

8:45 am
Mucociliary Clearance in Bronchial Bifurcations
Marcel Filoche¹,²,³, Michal Manolidis¹, Bruno Louis²,³,⁴, Daniel Isaby²,³,⁴, and James Grothberg³
¹Ecole Polytechnique, Palaiseau, France, ²Institut Mondor de Recherche Biomédicale, Créteil, France, ³Université Paris-Est, Créteil, France, ⁴ERL CNRS 7²40, Créteil, France

9:00 am
A Novel Structural Predictor of Emphysema Progression Using a Network Model of Lung Tissue Deterioration
Jarred Mondoñedo¹,² and Béla Suki¹
¹Boston University, Boston, MA, ²Boston University School of Medicine, Boston, MA

9:15 am
Optimization of Spectral Content in Oscillatory Ventilator Waveforms
Jacob Herrmann¹ and David Kaczka¹
¹University of Iowa, Iowa City, IA

OP-Thurs-1-19 Room 200J

Tracks: Neural Engineering, Nano and Micro Technologies

Micro/Nano Tools in Neurosciences

Chairs: Cho Hansang, Abigail Koppes

8:00 am
Multifunctional Nanoporous Gold Coatings for Neuroengineering Applications—INVITED
Erkin Seker¹
¹University of California, Davis, Davis, CA

8:15 am
In Vivo Recording from Mouse Retinal Ganglion Cells Using Syringe-Injectable Electronics
Guosong Hong¹, Tian-Ming Fu¹, Mu Qiao¹, Joshua Sanes¹, and Charles Lieber¹
¹Harvard University, Cambridge, MA

8:30 am
A Wireless Fully-Passive Neural Recorder Using RF Backscattering Effect
Shiyi Liu¹, Cedric Lee², Asimina Kiourti², John Volakís², and Junseok Chae¹
¹Arizona State University, Tempe, AZ, ²The Ohio State University, Columbus, OH

8:45 am
Targeting Motoneurons Using Cholera Toxin-B Coated Protocells
Maria Gonzalez Porras¹, Paul Durfee², C. Jeffrey Brinker², Gary Sieck¹, and Carlos Mantilla¹
¹Mayo Clinic, Rochester, MN, ²University of New Mexico, Albuquerque, NM
9:00 am
Focused Ultrasound Mediated Drug Delivery from Polymeric Perfluorocarbon Nanoemulsions for Noninvasive Neuromodulation
Randall Meyer1, Raag Airan1, Nicholas Ellens1, Qiuuyin Ren1, Callie Deng1, Keyvan Farahani2, Martin Pomper1, Shilpa Kadam1, and Jordan Green1
1Johns Hopkins University, Baltimore, MD, 2National Cancer Institute/National Institutes of Health, Bethesda, MD

9:15 am
Fluorescent Cyclic Peptide Nanoparticles to Detect Amyloid-beta Aggregates in Alzheimer’s Disease
Leming Sun1, Zhen Fan1, Tao Yue1, Yujian Huang1, Jeff Kuret2, Douglas Scharre3, and Mingjun Zhang1
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Department of Molecular and Cellular Biochemistry, The Ohio State University College of Medicine, Columbus, OH, 3Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH

OP-Thurs-1-20  Room 200A
Track: Bioinformatics, Computational and Systems Biology
Analysis of Cell Signaling I
Chairs: Matthew Lazzara, Pamela Kreeger
8:00 am
Chromatin Modifies Decoding of NF-κB Signaling to Regulate Gene Expression—INVITED
Victor Wong1, Arvind Chavali1, Suzanne Gaudet2, and Kathryn Miller-Jensen1
1Yale University, New Haven, CT, 2Dana Farber Cancer Institute, Boston, MA
8:30 am
A Combination of Stochastic and Deterministic Ca2+ Signal Decoding Guides VEGF-Driven Phenotype Selection
David Noren1, Amina Qutub1, Aryeh Warmflash1, Daniel Wagner1, Aleksander Popel2, and Andre Levchenko3
1Rice University, Houston, TX, 2Johns Hopkins University, Baltimore, MD, 3Yale University, New Haven, CT
8:45 am
Dynamic Transcription Factor Activity in Olaparib Resistant Cancer Cells
Joseph Decker1, Eric Hobson1, Kelly Arnold1, and Lonnie Shea1
1University of Michigan, Ann Arbor, MI
9:00 am
Proteins Find Their Niche: Competitive Binding Tunes Activation Profiles
Matthew Pharris1, Daniel Romano1, Neal Patel1, and Tamara Kinzer-Ursem1
1Purdue University, West Lafayette, IN
9:15 am
Differential Regulation of Hypertrophy and Apoptosis by Beta Adrenergic Signaling in Cardiomyocytes
Bryan Chun1 and Jeff Saucerman1
1University of Virginia, Charlottesville, VA
**Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2**

**OP-Thurs-2-1**
**Tracks: Biomechanics, Cellular and Molecular Bioengineering**

**Mechanobiology of Cardiac and Smooth Muscle**

*Chairs: Kimberly Stroka, Stuart Campbell*

1:00 pm
Insights from Microtissue Models of Cardiomyopathy—**INVITED**
Travis Hinson¹
¹University of Connecticut Health Center, Farmington, CT

1:15 pm
Measuring Acto-myosin Mediated Mechanical Anisotropy of Vascular Smooth Muscle Cells
Zaw Win¹, Justin Buksa¹, and Patrick Alford¹
¹University of Minnesota, Minneapolis, MN

1:30 pm
Effects of Physiologic Stretch Pattern on the Endoplasmic Reticulum in Vascular Smooth Muscle Cells
Elizabeth Bartolak-Suki¹ and Bela Suki¹
¹Boston University, Boston, MA

1:45 pm
Subcellular Cytoskeleton Architecture Regulates Mechanohomeostasis of Vascular Smooth Muscle Cells
Qianbin Wang¹, Xiaoyu Xu¹, Caroline Kopfler¹, and Weiqiang Chen¹
¹New York University, Brooklyn, NY

2:00 pm
Elucidating Vascular Smooth Muscle Cell Mechano-Adaptation Laws
Kerianne Steucke¹, Zaw Win¹, Taylor Stemler¹, Emily Walsh¹, and Patrick Alford¹
¹University of Minnesota, Minneapolis, MN

**OP-Thurs-2-2**
**Track: Cancer Technologies**

**Imaging Strategies and Molecular Profiling in Cancer**

*Chairs: Kandice Tanner, Kaushal Rege*

1:00 pm
Insights into Hallmarks of Early Carcinogenesis Using Nanoscale-Sensing Optical Microscopy—**INVITED**
Vadim Backman¹
¹Northwestern University, Evanston, IL

1:15 pm
Quantitative Mapping of Epidermal Growth Factor Receptor Endocytosis in Single Cancer Cells
Phuong Le¹, Kristopher Kilian¹, and Andrew Smith¹
¹University of Illinois at Urbana Champaign, Urbana, IL

1:30 pm
Mitochondrial Morphology as a Biomarker of Cancer Phenotype and Drug Response
Randy Giedt¹ and Ralph Weissleder¹
¹Massachusetts General Hospital/Harvard Medical School, Boston, MA

1:45 pm
Spatially Resolved Chemistry Related to Tumor Progression Using Imaging ToF-SIMS
Blake Bluestein¹, Fionnuala Morrisey², David Hockenberry², and Lara Gamble¹
¹University of Washington, Seattle, WA, ²Fred Hutchinson Cancer Research Center, Seattle, WA

2:00 pm
In Vivo Quantification of Cancer Cell-Surface Receptors Under Saturation Conditions by Generalized Paired-Agent Kinetic Model
Negar Sadeghipour¹, Scott Davis², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth, Hanover, NH

2:15 pm
Exploring Acoustic Angiography as an Early Radiation Therapy Response Evaluation Technique in Tumors
Sunny Kasoji¹, Judith Rivera¹, Ryan Gessen², Sha Chang³, and Paul Dayton¹
¹University of North Carolina- Chapel Hill/ North Carolina State University, Chapel Hill, NC, ²Sonovol, Chapel Hill, NC, ³UNC Chapel Hill School of Medicine, Chapel Hill, NC

**OP-Thurs-2-3**
**Tracks: Biomechanics, Cardiovascular Engineering**

**Cardiovascular Biomechanics II**

*Chairs: Kareen Coulombe, Joao Soares*

1:00 pm
Pulmonary Arterial Biomechanics: Measurement, Modeling and Impact—**INVITED**
Naomi Chesler¹
¹University of Wisconsin, Madison, WI

1:30 pm
Interrelationships between In Vivo Tissue Stress and Interstitial Cell Deformations in the Mitral Valve Anterior Leaflet in Normal and Surgically Modified States
Chung-Hao Lee¹, Kristen Feaver¹, Will Zhang¹, Robert Gorman², Joseph Gorman³, and Michael Sacks¹
¹The University of Texas at Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

1:45 pm
A Structural Model for the Lamellar Unit of Aortic Media Shows a Difference in the Local Stress-State for BAV and TAV Aneurysmal Tissue
James Thunes1, Julie Philipp1, Thomas Gleason1, David Vorp1, and Spandan Maiti1
1University of Pittsburgh, Pittsburgh, PA

2:00 pm
Biomimetic Models to Study Cell Mechanobiology at the Blood-Brain Barrier
Kelsey Gray1, Marina Shumakov1, Dakota Katz1, and Kimberly Stroka1
1University of Maryland, College Park, College Park, MD

2:15 pm
Three-Dimensional Mechanical Behavior of the Ovine Carotid Artery Bifurcation—Insights from Geometry and Microstructure
Ryan Mahutga1, John Carruth1, Christopher Korenczuk1, and Victor Barocas1
1University of Minnesota, Minneapolis, MN

OP-Thurs–2–4 Room 102AB
Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering
Naturally-Derived and Extracellular Matrix Biomaterials in Tissue Engineering
Chairs: Bryan Brown, Jordan Miller

1:00 pm
Developmental ECM for Cardiac Regeneration and Repair—INVITED
Kyle Edmunds1, Corin Williams1, Whitney Stoppel1, Breanna Duffy1, Jacques Guyette2, Harald Ott1, Justin Weinbaum1, and Lauren Black1,4
1Tufts University, Medford, MA, 2Mass General Hospital, Boston, MA, 3University of Pittsburgh, Pittsburgh, PA, 4Tufts University School of Medicine, Boston, MA

1:30 pm
Properties of Remodeled ECM Scaffolds in the Temporomandibular Joint
Jesse Lowe1, William Chung1,2, Bryan Brown1,2, Scott Johnson1,2, Stephen Badyak1,2, and Alejandro Almarza1,2
1University of Pittsburgh, Pittsburgh, PA, 2McGowan Institute of Regenerative Medicine, Pittsburgh, PA

1:45 pm
Injectable Gel Scaffold Composed of Homogenized Acellular Tissue Conjugated with Gold Nanoparticles and Curcumin
Colten Snider1, David Grant1, Seth Sherman1, and Sheila Grant1
1University of Missouri, Columbia, MO

2:00 pm
Hybrid Scaffold of Aligned Electrospin Fiber and Fibroblast-derived Matrix for Cardiac Tissue Engineering
Muhammad Suhaeri1,2, Ramesh Subbiah1,2, Su-Hyun Kim1, Chong-Hyun Kim1, and Kwideook Park1,2
1Korea Institute of Science and Technology, Seoul, Korea, Republic of, 2Korea University of Science and Technology, Daejon, Korea, Republic of

2:15 pm
Engineering a Pancreatic Islet Bioinstructive Microenvironment: A Comparative Study of Mouse and Human Islets
Clarissa Hernandez1, Kara Benninger2, Raghu Mirmira2, Robert Considine2, and Sherry Voytik-Harbin1
1Purdue University, West Lafayette, IN, 2Indiana University School of Medicine, Indianapolis, IN

OP-Thurs–2–5 Room 102C
Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering
Musculoskeletal Tissue Engineering II
Chairs: Jan Stegemann, Megan McCain

1:00 pm
Development of 2D and 3D Engineered Muscle Tissue Constructs—INVITED
Rebecca Duffy1 and Adam Feinberg1
1Carnegie Mellon University, Pittsburgh, PA

1:15 pm
Forward Engineering the Functionality of 3D Printed Skeletal Muscle-Powered Biological Machines
Caroline Cvetkovic1, Meghan Ferrall-Fairbanks2, Ritu Raman1, Manu Plat1, and Rashid Bashir1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Georgia Institute of Technology, Atlanta, GA

1:30 pm
Engineered Human Skeletal Muscle Tissues with Maintained Satellite Cell Pool
Jason Wang1, Mark Juhas1, Alastair Khodabakus1, and Nenad Bursac1
1Duke University, Durham, NC

1:45 pm
CRISPR Epigenome Editing to Promote Osteogenic Differentiation in Adipose-Derived Mesenchymal Stem Cells
Hunter Levi1, Niloofar Farhang1, Xue Yin1, Joshua Stover1, Brandon Lawrence1, and Robert Bowles1
1University of Utah, Salt Lake City, UT

2:00 pm
Injectable, Cell-Seeded, Modular Microtissues for Bone Regeneration in Critical Size Defects
Ramkumar Tiruvannamalai Annamalai1, Shailesh Agarwal1, Benjamin Levi1, and Jan Stegemann1
1University of Michigan, Ann Arbor, MI

2:15 pm
Validation of An Osteochondral Bioreactor Applied To Study The Protective Role Of Sex Hormones
Riccardo Gottardi1,2, Hang Lin1, Laura Iannetti1, Giovanna D’Urso1, Paolo Zunino1, Thomas Lozito1, Peter Alexander1, Paul Manner4, Elizabeth Sefton5, Teresa Woodruff6, and Rocky Tuan1
1University of Pittsburgh, Pittsburgh, PA, 2Fondazione Ri.MED, Palermo, Italy, 3Politecnico di Milano, Milano, Italy, 4University of Washington, Seattle, WA, 5Department of Obstetrics and Gynecology, Chicago, IL

OP-Thurs–2–5 Room 102C
Tracks: Tissue Engineering, Orthopaedic and Rehabilitation Engineering
Musculoskeletal Tissue Engineering II
Chairs: Jan Stegemann, Megan McCain

1:00 pm
Development of 2D and 3D Engineered Muscle Tissue Constructs—INVITED
Rebecca Duffy1 and Adam Feinberg1
1Carnegie Mellon University, Pittsburgh, PA

1:15 pm
Forward Engineering the Functionality of 3D Printed Skeletal Muscle-Powered Biological Machines
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1University of Illinois at Urbana-Champaign, Urbana, IL, 2Georgia Institute of Technology, Atlanta, GA

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1University of Utah, Salt Lake City, UT

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1University of Michigan, Ann Arbor, MI

2:15 pm
Validation of An Osteochondral Bioreactor Applied To Study The Protective Role Of Sex Hormones
Riccardo Gottardi1,2, Hang Lin1, Laura Iannetti1, Giovanna D’Urso1, Paolo Zunino1, Thomas Lozito1, Peter Alexander1, Paul Manner4, Elizabeth Sefton5, Teresa Woodruff6, and Rocky Tuan1
1University of Pittsburgh, Pittsburgh, PA, 2Fondazione Ri.MED, Palermo, Italy, 3Politecnico di Milano, Milano, Italy, 4University of Washington, Seattle, WA, 5Department of Obstetrics and Gynecology, Chicago, IL
OP-Thurs–2–6  Room 101A

Track: Cellular and Molecular Bioengineering

Molecular and Cellular Engineering Functional Materials and Sensors

Chairs: Gregory Hudalla, Gabe Kwong

1:00 pm
Solving Drug Delivery Problems by Genetically Engineered Nanoparticles—INVITED
 Ashutosh Chilkoti1
  1Duke University, Durham, NC

1:15 pm
Design and Assembly of Nanostructured Polyvalent Biomaterials—INVITED
 Ravi Kane1, Chad Varner1, Tania Rosen1, and Anmar Arsiwala1
  1Georgia Tech, Atlanta, GA

1:30 pm
Design, Construction and Application of an Ezrin Tension Sensor
 Matthew Berginski1, Andrew LaCroix1, and Brenton Hoffman1
  1Duke University, Durham, NC

1:45 pm
Engineering Synthetic Toehold Switch for Visualization of Single Cell microRNA Activity
 Shue Wang1, Nicholas Emery1, and Allen Liu1
  1University of Michigan, Ann Arbor, MI

2:00 pm
Highly Multiplexed Analysis of Cancer-specific T cells using DNA-barcoded peptide-MHC Tetramers
 Shreyas Dahotre1–2 and Gabriel Kwong1–2
  1Georgia Institute of Technology, Atlanta, GA,
  2Emory University, Atlanta, GA

2:15 pm
Tunable Thermal Bioswitches for In Vivo Control of Microbial Therapeutics
 Mohamad Abedi1, Dan Piraner1, Brittany Moser1, Audrey Lee-Gosselin1, and Mikhail Shapiro1
  1California Institute of Technology, Pasadena, CA

OP-Thurs–2–8  Room 101C

Track: Cancer Technologies

Implant and Prosthetic Biomechanics

Chairs: Anita Singh, Antonio Valdevit

1:00 pm
Glenoid Baseplate Micromotion In Reverse Total Shoulder Arthroplasty
 Jennifer Anderson1, John Tokish2, Stefan Tolan2, Richard Hawkins3, Alan Marionneau4, and John DesJardins1
  1Clemson University, Clemson, SC, 2Steadman Hawkins Clinic of the Carolinas, Greenville, SC

1:15 pm
Cell-secreted Fibronectin Supports Metastatic Latency in the Bone Marrow Matrix
 Lauren Barney1, Christopher Hall1, Alyssa Schwartz1, and Shelly Peyton1
  1University of Massachusetts, Amherst, Amherst, MA

1:30 pm
The Energy Costs Associated with Cell Migration Through Collagen Gels
 Marianne Lintz1, Joseph Miller1, Zachary Golddblatt1, Aniqua Rahman1, and Cynthia Reinhart-King1
  1Cornell University, Ithaca, NY

1:45 pm
Aligned Collagen Micro-tissues to Study Invasion of Cancer Cells on 3D Fiber Tracks
 Arja Ray1, Zachary Slama1, Samantha Madden1, and Paolo Provenzano1
  1University of Minnesota, Twin Cities, Minneapolis, MN

2:00 pm
Evaluating Microenvironmental Changes Following Normal Tissue Irradiation: The Role of CD8+ T Cells in Breast Tumor Cell Migration In Vivo
 Marjan Rafat1, Marta Vilalta1, Todd Aguiera1, Amato Giaccia1, and Edward Graves1
  1Stanford University, Stanford, CA

2:15 pm
In Vitro Breast Tumor Model to Investigate the Role of Tumor Microenvironment in Disease Progression
 Srivatsan Kidambi1
  1University of Nebraska-Lincoln, Lincoln, NE
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<th>Time</th>
<th>Session Title</th>
<th>Authors</th>
<th>Affiliations</th>
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<tbody>
<tr>
<td>1:30 pm</td>
<td>Constraint Testing of Flat, Semi-Constrained, and Mobile Bearing Total Knee Replacements</td>
<td>Lucy Young⁴, Kyle Snethen⁴, Patrick Brandt⁴, Madeline Bebler⁴, Haley Leslie⁴, and Melinda Harman⁴</td>
<td>¹Clemson University, Clemson, SC</td>
</tr>
<tr>
<td>1:45 pm</td>
<td>The Role of Task Expertise in Startle Evoked Movements</td>
<td>Maria Jose Quezada⁴ and Claire Honeycutt⁴</td>
<td>¹Arizona State University, Tempe, AZ</td>
</tr>
<tr>
<td>2:00 pm</td>
<td>Modification of a Magnesium Based Metal for Internal Fixation Applications</td>
<td>Michael Sealy⁵, Dale Feldman², Yeubin Guo⁵, and Jonah Sharkins²</td>
<td>¹University of Nebraska, Lincoln, NE, ²UAB, Birmingham, AL, ³University of Alabama, Tuscaloosa, AL</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>A Novel Distractive and Mobility-Enabling Lumbar Spinal Orthosis</td>
<td>Denis DiAngelo¹ and Daniel Hillyard¹</td>
<td>¹University of Tennessee Health Science Center, Memphis, TN</td>
</tr>
</tbody>
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**OP-Thurs-2-9 Room 101D**

**Track: Stem Cell Engineering**

**Directing Stem Cell Differentiation I**

**Chairs: Yuguo Lei, Gulden Camci-Unal**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
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<tbody>
<tr>
<td>1:00 pm</td>
<td>The Role of Adipose-Derived Stem Cells in Skeletal Muscle Repair—INVITED</td>
<td>Viktoriya Rybalko¹, Pei-Ling Hsieh¹, Roger Farrar¹, and Laura Suggs¹</td>
<td>¹University of Texas at Austin, Austin, TX</td>
</tr>
<tr>
<td>1:30 pm</td>
<td>Characterization of Smooth Muscle Cells and Urothelial Cells Differentiated from Adipose Derived Stem Cells for Bladder Tissue Engineering Applications</td>
<td>Caitlyn Ambrose¹ and Jiro Nagatomi¹</td>
<td>¹Clemson University, Clemson, SC</td>
</tr>
<tr>
<td>1:45 pm</td>
<td>Keratin Hydrogels Promote Smooth Muscle Differentiation from c-kit+ Human Cardiac Stem Cells</td>
<td>Benjamin Ledford¹, Jamelle Simmons¹, Miao Chen¹, Lijuan Kan¹, Mark Van Dyke¹, and Jia-Qiang He¹</td>
<td>¹Virginia Tech, Blacksburg, VA</td>
</tr>
<tr>
<td>2:00 pm</td>
<td>Regulating Arterial Venous Differentiation of Pluripotent Stem Cells through Immobilized and Soluble Signals</td>
<td>Taylor Dorsey¹, Diana Kim¹, and Guohao Dai¹</td>
<td>¹Rensselaer Polytechnic Institute, Troy, NY</td>
</tr>
</tbody>
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<th>Time</th>
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<tr>
<td>2:15 pm</td>
<td>Murine Cardiomyocyte Differentiation via Nutrient Deprivation-Mediated Activation of -catenin</td>
<td>Jangwook Jung¹, Pablo Hofbauer¹, Tanner McArule¹, and Brenda Ogle¹</td>
<td>¹University of Minnesota-Twin Cities, Minneapolis, MN</td>
</tr>
</tbody>
</table>

**OP-Thurs-2-10 Room 101E**

**Track: Biomaterials**

**Biomaterial Scaffolds I**

**Chairs: Katelyn Swindle-Reilly, Jeff Wolchok**

<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>1:00 pm</td>
<td>Multivariate Scaffold Designs that Mimic the Complexity of Tissue Interfaces—INVITED</td>
<td>Elizabeth Cosgriff-Hernandez¹, Alysha Kishan¹, Andrew Robbins¹, Mingliang Jiang¹, Veyesl Erel¹, and Michael Moreno¹</td>
<td>¹Texas A&amp;M University, College Station, TX</td>
</tr>
<tr>
<td>1:30 pm</td>
<td>Fabrication of Biphasic Scaffold for Treatment of Chronic Wound Healing</td>
<td>Allison Goins¹, Vidhya Ramaswamy¹, and Josepine Allen¹</td>
<td>¹University of Florida, Gainesville, FL, ²Institute for Cell and Tissue Science and Engineering, Gainesville, FL</td>
</tr>
<tr>
<td>1:45 pm</td>
<td>Engineering Synthetic Matrices to Guide Intestinal Organoid Morphogenesis</td>
<td>Victor Hernandez-Gordillo¹, GiHun Choi¹, Rebecca Carrier¹, and Linda Griffith¹</td>
<td>¹Massachusetts Institute of Technology, Cambridge, MA, ²Northeastern University, Boston, MA</td>
</tr>
<tr>
<td>2:00 pm</td>
<td>Tunable, “Self-fitting” Shape Memory Polymer (SMP) Scaffolds for Cranial Bone Defect Repair</td>
<td>Lindsay Woodard¹, Vanessa Page¹, Kevin Kmetz¹, and Melissa Grunlan¹</td>
<td>¹Texas A&amp;M University, College Station, TX</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>Development of a Biodegradable Polymer-Metal Composite as a Novel Biomaterial</td>
<td>Tyler Stahl¹, Thomas Xu², and Syam Nukavarapu¹</td>
<td>¹University of Connecticut, Storrs, CT, ²University of Connecticut Health Center, Farmington, CT</td>
</tr>
</tbody>
</table>

* Biomaterials Track sponsored by **ACS Biomaterials**
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

**OP-Thurs-2-11**  Room 200E

**Tracks: Cardiovascular Engineering, Device Technologies and Biomedical Robotics**

**Cardiovascular Devices II**

*Chairs: Alexandrina Untaroiu, Varun Bhatia*

1:00 pm

**Chronic Cyclic Vagus Nerve Stimulation has Beneficial Electrophysiological Effects on Healthy Hearts in the Absence of Autonomic Imbalance**

Steven Lee1, Qinglu Li1, Imad Libbus2, Bruce H. KenKnight2, Mary Garry3, and Elena Tolkacheva1

1University of Minnesota, Minneapolis, MN, 2Cyberonics Inc, Houston, TX

1:15 pm

**Quantitative Analyses of the Relative Distributions of Epicardial Adipose on Human Hearts**

Alexander Mattsson1, Teri Whitman2, Michael Eggen2, and Paul Laizzo1

1University of Minnesota, Minneapolis, MN, 2Medtronic PLC, Mounds View, MN

1:30 pm

**Development and Feasibility Testing of a Novel Left Ventricular Assist Device (LVAD) Outflow Graft Anastomosis Device (GrAD)**

Young Choi1, Michael Sobieski2, Guruprasad Giridharan1, Michele Gallo1,2, Mark Slaughter1, Zhongjun Wu1, and Steven Koenig1

1University of Louisville, Louisville, KY, 2University of Padua, Padua, Italy

1:45 pm

**A High-Throughput Microfluidic Device for the Selective Removal of Activated Granulocytes from Recirculating Whole Blood during Cardiopulmonary Bypass**

Briony Strachan1, Hui Xia1, Sean Gifford2, and Sergey Shevkoplyas1

1University of Houston, Houston, TX, 2Halcyon Biomedical Incorporated, Friendswood, TX

2:00 pm

**A Novel Design for a Decellularized Tissue Engineered Transcatheter Aortic Valve**

Melissa Young1, Nicholas Styoles2, Ryan Hennessy1, Brandon Tofft3, Soumen Jana4, Rebecca Hennessy1, and Amir Lerman1

1Mayo Clinic, Rochester, MN, 2Mayo Clinic, Rochester, Afghanistan

2:15 pm

**Polyethylene Oxide Coated Controlled Drug-Eluting Balloons: In Vivo Evaluation in a Rabbit Model**

Jordan Anderson1, Sujan Lamicichane1, Daniel Engebretson1, Gopinath Mani1, Tyler Remund2, Katie Pohlson2, Amber Wolf2, and Patrick Kelly3

1University of South Dakota, Sioux Falls, SD, 2Sanford Research, Sioux Falls, SD, 3Sanford Health, Sioux Falls, SD

**OP-Thurs-2-12**  Room 200F

**Track: Device Technologies and Biomedical Robotics**

**Affordable Health Devices and Frugal Innovation**

*Chairs: Daniel Ratner, Jacqueline Linnes*

1:00 pm

**A Distributable Paper-based Diagnostic Kit for Point-of-Care Screening for Sickle Cell Disease**

Kian Torabian1, Dalia Lezzar1, Nathaniel Piety1, Alex George2, and Sergey Shevkoplyas1

1University of Houston, Houston, TX, 2Baylor College of Medicine, Houston, TX

1:30 pm

**Rapid Paperfluidic Molecular Diagnostic for Field Detection of Cholera in Drinking Water in Haiti**

Taylor Moehling1, Sonia Bhatt1, Jacqueline Linnes1, and Jacqueline Linnes1

1Purdue University, West Lafayette, IN

1:45 pm

**Quantification of C-Reactive Protein using a Lateral Flow Immunoassay and a Smartphone-enabled Device**

Elizabeth Rey1, Dakota O’Dell1, Seoho Lee1, and David Erickson1

1Cornell University, Ithaca, NY

2:00 pm

**Improving Paper-based Protein Detection with Dehydrated Two-Phase Micellar Components**

David Pereira1, Samantha Zhang1, Benjamin Wu1, and Daniel Kamei1

1UCLA, Los Angeles, CA

2:15 pm

**A Simple Device for Bedside Washing of Stored Red Blood Cells**

Eszter Voros1, Nathaniel Piety1, and Sergey Shevkoplyas1

1University of Houston, Houston, TX

**OP-Thurs-2-13**  Room 200D

**Track: Bioinformatics, Computational and Systems Biology**

**Systems Approaches to Therapy, Therapeutics, and Precision Medicine**

*Chairs: Ashlee Ford Versypt, David Noren*

1:00 pm

**Overcoming Adaptive Resistance and Fractional Response of Cancer Cells to Targeted Therapy**

Mohammad Fallahi-Sichani1, Verena Becker1, Gregory Baker1, Sarah Boswell2, Robert Everley1, Jia-Ren Lin1, and Peter Sorger1

1Harvard Medical School, Boston, MA
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

1:15 pm
Optimization of Acute Myeloid Leukemia Predictions with a Five-Fold Cross-Validated Genetic Algorithm
Carlos Bueno1, Luiza Ferreira1, John Gawedzinski1, Sangheon Han1, Sohyun Park1, Trenton Piepergerdes1, and Amina Qutub1
1Rice University, Houston, TX

1:30 pm
Hidden Networks in Antibiotic Target Discovery
Paul Jensen1,2, Zeyu Zhu2, and Tim van Opijnen2
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Boston College, Chestnut Hill, MA

1:45 pm
OntoBIDS: An Ontology Driven BioImage Dataset Discovery System.
Menno VanDiermen1, Etienne Gnimpieba2, and Carol Lushbough1
1University of South Dakota, Vermillion, SD, 2University of South Dakota, Sioux Falls, SD

2:00 pm
Systems Pharmacology Predicts Antibiotic Spatial Distribution and Efficacy In TB Granulomas
Elise Pienaar1, Jansy Sarathy2, Brendan Prideaux2, Veronique Dartois2, Denise Kirschner1, and Jennifer Linderman1
1University of Michigan, Ann Arbor, MI, 2Public Health Research Institute and New Jersey Medical School, Newark, NJ

2:15 pm
Cytoprofiling and Microscale Cis-co-culture for Predicting Therapy Resistance in Multiple Myeloma
Jay Warrick1, Loren Stallcop1, Yasmin Alvarez-Garcia1, Dominique Lisiero1, Kenneth Chng1, Mailee Huynh1, Natalie Callander1, Shigeki Miyamoto1, and David Beebe1
1University of Wisconsin Madison, Madison, WI

OP-Thurs-2-14 Room 200G

Track: Nano and Micro Technologies

Micro and Nanoscale Tools for Monitoring Inflammation

Chairs: Daniel Irimia, Amir Farnoud

1:00 pm
Biomimetic Delivery Platforms to Target Inflammation—INVITED
Ennio Tasciotti1
1Houston Methodist Research Institute, Houston, United States Minor Outlying Islands

1:15 pm
Neutrophil Swarming-on-a-chip for the Study of Collective Cell Migration
Eduardo Reategui1, Hunter Elliott2, Jesmond Dalli3, Fatemeh Jalali1, Aimal Khankhel1, Elisabeth Wong1, Hansang Cho1, Charles N. Serhan1, and Daniel Irimia1
1Harvard Medical School / Massachusetts General Hospital, Charlestown, MA, 2Harvard Medical School, Boston, MA, 3Harvard Medical School / Center for Experimental Therapeutics and Reperfusion Injury, Brigham and Women’s Hospital, Boston, MA

1:30 pm
Activity-based Nanoparticles for Noninvasive Monitoring Of Organ Transplant Rejection
Quoc Mac1, Dave Mathews2, Andrew Adams2, and Gabe Kwong1
1Georgia Tech & Emory, Atlanta, GA, 2Emory School of Medicine, Atlanta, GA

1:45 pm
A Biomimetic Microfluidic Particle Tracker for Enumeration of White Blood Cells Subtypes and Quantification of Antigen Surface Expression Level
Tannay Ghonge1, Bobby Reddy1, Anurup Ganguli1, Greg Damhorst1, Umer Hassan1, and Rashid Bashir1
1University of Illinois at Urbana Champaign, Urbana, IL

2:00 pm
The Importance of Nanoparticle Size and Ligand Density in Cell Modulation
John Hickey1,2, Fernando Vicente-Zegarra1, and Jonathan Schneck2
1Johns Hopkins University, Baltimore, MD, 2Johns Hopkins School of Medicine, Baltimore, MD

2:15 pm
Micro-Physiological Systems to Study Endothelial Barrier Functions In Sepsis
Tejas Khire1, Richard Waugh1, and James McGrath1
1University of Rochetser, Rochester, NY
1:45 pm
Evaluation of Computational Endomicroscopy Architectures for In Vivo Optical Biopsy
John Paul Dumas¹, Muhammad Lodhi¹, Waheed Bajwa¹, and Mark Pierce¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

2:00 pm
High-resolution In Vivo Imaging of a Centimeter-large Mouse Tumor using Ultrasound-switchable Fluorescence
Bingbing Cheng¹ and Baohong Yuan¹
¹University of Texas at Arlington, Arlington, TX

2:15 pm
Developing Monitors of Cerebral Hemodynamics for Extracorporeal Membrane Oxygenation Therapy
David Busch¹,², Constantine Mavroudis³, Genevieve Dupont-Thibodeau¹, Ann McCarthy¹, Tiffany Ko², Madeline Winters², John Newland³, Kobina Mensah-Brown¹, Kaitlin Griffith³, Jennifer Lynch³, Peter Schwab², Erin Buckley³, Arjun Yodh³, and Daniel Licht¹
¹Children’s Hospital of Philadelphia, Philadelphia, PA, ²University of Pennsylvania, Philadelphia, PA, ³Hospital of the University of Pennsylvania, Philadelphia, PA, ⁴Temple University, Philadelphia, PA, ⁵New York University, New York, NY, ⁶Georgia Tech, Atlanta, GA

1:00 pm
Gradient Release of Cardiac Morphogen by Photo-responsive Polymer Micelles for Spatiotemporal Control of Embryonic Stem Cell Differentiation
Mukesh Gupta¹, Daniel Balikov¹, Young Chun¹, Douglas Sawyer², and Hak-Joon Sung¹
¹Vanderbilt University, Nashville, TN, ²Maine Medical Institute, Scarborough, ME

1:15 pm
Localized and Sustained Delivery of siRNA from Hydrogels to Enhance Fracture Healing
Yuchen Wang¹ and Danielle Benoit¹
¹University of Rochester, Rochester, NY

1:30 pm
Macrophage-mediated Degradation of Gelatin Microspheres for Release of Bone Morphogenetic Protein
Ramkumar Tiruvannamalai Annamalai¹, Paul Turner¹, William Carson¹, and Jan Stegemann¹
¹University of Michigan, Ann Arbor, MI

1:45 pm
Recombinant Elastin Based Nanoparticles for Targeted Gene Therapy
Dagmara Monfort¹ and Piyush Koria¹
¹University of South Florida, Tampa, FL

2:00 pm
Stable Nanodroplets for Controlled Drug Release and Monitoring Using Ultrasound
Yoonjee Park¹, Madison Taylor¹, Zhe Zhang¹, Courtney Collins¹, Hsuan-Yeh Pan¹, Eric Mahoney¹, Karla Mercado¹, Kevin Haworth¹, and Chia-Ying Lin¹
¹University of Cincinnati, Cincinnati, OH

2:15 pm
Oral Vaccine Delivery using Ragweed Pollen Grains
Md Jasim Uddin¹ and Harvinder Gill³
¹Texas Tech University, Lubbock, TX

OP-Thurs-2-17 Room 200B
Track: Orthopaedic and Rehabilitation Engineering
Articular Cartilage and Joints
Chairs: Clark Hung, Rhima Coleman

1:00 pm
Bisphosphonate Rescues Articular Cartilage from Trauma Damage—INVITED
Yilu Zhou¹, Mengxi Lv¹, Shongshan Fan¹, Liyun Wang¹, and X. Lucas Lu¹
¹University of Delaware, Newark, DE

1:15 pm
Effect of Focal Chondral Defects on the Biphasic Mechanics of Cartilage in the Hip
Jocelyn Todd¹, Benjamin Ellis¹, Travis Maak¹, and Jeff Weiss¹
¹University of Utah, Salt Lake City, UT

1:30 pm
Direct Evidence for Tribological Rehydration Of Cartilage Via In Situ Quantification Of Solute Transport
Brian Graham¹, Axel Moore¹, David Burris¹, and Christopher Price¹
¹University of Delaware, Newark, DE

1:45 pm
A Novel Method for Early Diagnosis of Osteoarthritis
Mustafa Unal¹ and Ozan Akkus¹
¹Case Western Reserve University, Cleveland, OH

2:00 pm
Magnitude-Dependent and Inversely-related Osteogenic/Chondrogenic Differentiation of Human Mesenchymal Stem Cells Under Dynamic Compressive Strain
Christopher Horner¹, Koji Hirota¹, Junze Liu¹, Hyle Park¹, and Jin Nam¹
¹University of California, Riverside, CA

2:15 pm
Microscale Mechanics of The Interface Of Native And Repaired Articular Cartilage
Rebecca Irwin¹, Darvin Griffin¹, Amanda Meppelink², Itai Cohen¹, Mark Randolph², and Lawrence Bonassar¹
¹Cornell University, Ithaca, NY, ²Massachusetts General Hospital, Boston, MA
Thursday, October 6 | 1:00 pm–2:30 pm | Platform Session 2

**OP-Thurs–2–18**

**Room 200I**

**Track:** Respiratory Bioengineering  
**Computational Mechanics of the Respiratory System**

**Chairs:** Jason Bates, Bela Suki

**1:00 pm**  
**Cost Functions to Predict Ventilator-Induced Lung Injury and Personalize Mechanical Ventilation**  
Katharine Hamlington1, Bradford Smith1, Gilman Allen1, and Jason Bates1  
1University of Vermont College of Medicine, Burlington, VT

**1:15 pm**  
**Statistics of Liquid Plug Rupture Events in the Lung**  
Marcel Filoche1,2,3,4 and James Grotberg5  
1École Polytechnique, Palaiseau, France, 2Institut Mondor de Recherche Biomédicale, Créteil, France, 3Université Paris-Est, Créteil, France, 4ERL CNRS 7²40, Créteil, France, 5University of Michigan, Ann Arbor, MI

**1:30 pm**  
**Modeling Lung Mucous Flows with Particle Method**  
Hideki Fujioka1 and Donald Gaver III1  
1Tulane University, New Orleans, LA

**1:45 pm**  
**The Audible Human Project: Study of Acoustic Transmission with a Fractal Based Model of the Human Airways**  
Brian Henry1 and Thomas Royston1  
1University of Illinois at Chicago, Chicago, IL

**2:00 pm**  
**Chronic Assessment of Respiratory Muscle Function after Unilateral Phrenic Nerve Denervation**  
Obaid Khurram1, Gary Sieck1, and Carlos Mantilla1  
1Mayo Clinic College of Medicine, Rochester, MN

**2:15 pm**  
**A Global Index for Characterizing Ciliary Beating Efficiency in Pulmonary Airways**  
Mathieu Bottier1,2,3, Marta Pena-Fernandez1,2,3, Gabriel Pelle1,2,3, Emilie Bequignon1,2,3, Daniel Isabey1,2,3, André Coste1,2,3, Estelle Escudier1,2,3, James Grotberg4, Jean-François Papon1,2,3, Bruno Louis1,2,3, and Marcel Filoche1,2,3  
1Institut Mondor de Recherche Biomédicale, Créteil, France, 2Université Paris-Est, Créteil, France, 3ERL CNRS 7²40, Créteil, France, 4University of Michigan, Ann Arbor, MI, 5École Polytechnique, Palaiseau, France

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**OP-Thurs–2–19**

**Room 200J**

**Tracks:** Neural Engineering, Tissue Engineering  
**Spinal Cord Tissue Engineering & Repair**

**Chairs:** Harini Sundararaghavan, Stephanie Seidlits

**1:00 pm**  
**Genome Engineering to Understand the Role of Interneurons in Recovery After Spinal Cord Injury—INVITED**  
Shelly Sakiyama-Elbert1 and Hao Xu1  
1Washington University, St. Louis, MO

**1:15 pm**  
**Biomaterial-Mediated Gene Delivery Targeting Reduced Inflammation after Spinal Cord Injury—INVITED**  
Stephanie Seidlits1,2, Daniel Margul2,3, Ryan Boehler2, Dominique Smith2,3, Jonghyuk Park2, Aishani Ataliwala1, Todor Kukushliev2, Mitchell Johnson2, and Lonnie Shea2,3  
1UCLA, Los Angeles, CA, 2Northwestern University, Evanston, IL, 3University of Michigan, Ann Arbor, MI

**1:30 pm**  
**Local Delivery of Minocycline from Metal Ion-Assisted Self-Assembled Complexes Promotes Neuroprotection and Functional Recovery after Spinal Cord Injury**  
Zhicheng Wang1, Jia Nong1, and Yinghui Zhong1  
1Drexel University, Philadelphia, PA

**1:45 pm**  
**Optimizing Vagus Nerve Stimulation Paired with Rehabilitation to Enhance Recovery after Spinal Cord Injury**  
Michael Darrow1, Andrea Ruiz1, Patrick Ganzer1, Abby Berry1, Elaine Lai1, Luz Barron Horta1, Alexa Gilfoyle1, Lea Simone1, and Seth Hays1  
1University of Texas at Dallas, Richardson, TX

**2:00 pm**  
**Improvement of Schwann Cell Transplantation using Injectable Hydrogels after Spinal Cord Injury**  
Laura Marquardt1, Karen Dubbin1, Vanessa Doulamas2, Giles Plant3, and Sarah Heilshorn1  
1Stanford University, Stanford, CA, 2Stanford University School of Medicine, Stanford, CA

**2:15 pm**  
**Schwann Cell loaded PVDF-TrFE Scaffolds Promote Axon Regeneration after Spinal Cord Injury**  
Yee-Shuan Lee1, Siliang Wu2, Treena Arinzeh2, and Mary Bunge1  
1University of Miami, Miami, FL, 2New Jersey Institute of Technology, Newark, NJ
MEET THE EXPERT
1:00 pm–2:30 pm  Room 204

NIH Funding: Meet Program Directors, Reviewers, and Awardees

Organized by Tony Dickherber, PhD, Program Director, Innovative Molecular Analysis Technologies (IMAT) Program, Center for Strategic Scientific Initiatives, National Cancer Institute

This session will provide an overview of NIH funding opportunities and resources particularly well-suited to the BMES research community. BMES colleagues will offer insights and “lessons learned” from the perspective of winning these NIH awards as well as in serving on NIH review panels. The session will explore how researchers may develop strategies to align their research interests with NIH opportunities and priorities.

Panel Members:

- Michelle A. Berny-Lang, PhD, Program Director, Office of the Director, Center for Strategic Scientific Initiatives, National Cancer Institute (NCI)
- Tony Dickherber, PhD, Program Director, Innovative Molecular Analysis Technologies (IMAT) Program, Center for Strategic Scientific Initiatives, National Cancer Institute (NCI)
- Prof. Dawn Elliott, PhD, Director of Biomedical Engineering, University of Delaware
- Prof. Adam Engler, Dept. of Bioengineering, Sanford Consortium for Regenerative Medicine, University of California, San Diego
- Zeynep Erim, PhD, Program Director, Division of Interdisciplinary Training (DIDT), National Institute of Biomedical Imaging and Bioengineering (NIBIB)
- Prof. Linda Griffith, School of Engineering Professor of Teaching Innovation, Biological Engineering, and Mechanical Engineering, Massachusetts Institute of Technology
- Prof. Roger Kamm, Cecil and Ida Green Distinguished Professor of Biological and Mechanical Engineering, Massachusetts Institute of Technology
- Christine Kelley, PhD, Director, DDST, Division of Discovery Science & Technology (DDST), National Institute of Biomedical Imaging and Bioengineering (NIBIB)
- Nastaran Zahir Kuhn, PhD, Associate Director, Division of Cancer Biology, Program Director, Physical Sciences-Oncology, National Cancer Institute (NCI)
- Prof. Todd Sulchek, PhD, Associate Professor, Bioengineering, Georgia Institute of Technology
- Prof. Rong Fan, PhD, Associate Professor, Department of Biomedical Engineering, Yale University
International Symposium on Biomedical Engineering

Chairs: Song Li, Damir Khismatullin

Biomedical engineering is a fast growing field. The purpose of this symposium is to provide an overview of biomedical engineering research and education around the world, and facilitate the collaboration.

Panel Members:
- Richard Hart, Ph.D., President, Biomedical Engineering Society, USA,
- Yubo Fan, Ph.D., President, Chinese Society of Biomedical Engineering.
- Anthony Weiss, Ph.D., President of Australia and New Zealand MBS
- Hanjoong Jo, Ph.D., Hanjoong Jo, President of the Korean American BME Society
- Michael Capuano, Vice-President of the Canadian Medical and Biological Engineering Society

Developing Best Practices for Graduate Training in Biomedical Innovation

Chairs: Gilda Barabino, Jeffrey Garanich

Many universities have begun offering specialized graduate training in the process of translating academic research into medical innovations that have real impacts on patient care. With this growth of the field, now is an opportune time to hold a collaborative conversation on shared themes, challenges such programs face, and new directions for enhanced impact.

Special Industry Topics

Chairs: Christopher Basciano

This session will include technical platform talks from industry professionals on a research or product. In addition, the BMES Cellular and Molecular Bioengineering SIG will hold a panel on Commercialization of Bone Regeneration products, and the BMES Medical Devices SIG will hold a session on V&V in medical devices.

Quantitative Electroencephalography Dynamics in Prediction of Drowsy Driving on Simulator

Chaoyang Chen¹, Chaofei Zhang², Bo Cheng², Wenjun Wang², Chao Zeng³, Yang Zhou³, and John Cavanaugh¹
¹Wayne State University, Detroit, MI, ²Tsinghua University, Beijing, China, People’s Republic of, ³Shihezi University, Shihezi, China, People’s Republic of

Intraoperative Surgical Monitor for Detection of Trauma during Cochlear Implantation

Christopher Giardina¹, Tatyana Fontenot¹, Andrew Pappa¹, William Scott¹, Kevin Brown¹, and Harold Pillsbury¹
¹UNC School of Medicine, Chapel Hill, NC
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs-3-1**  
**Auditorium 1**  
**Tracks: Biomechanics, Cellular and Molecular Bioengineering**  
**Substrate Effects in Mechanobiology**  
*Chairs:* Brenda Ogle, Lance Kam  

3:15 pm  
**Topographic Confinement of Epithelial Clusters Combines with Matrix Stiffness to Induce Mesenchymal Transition**  
Samila Nasrollahi\(^1\) and Amit Pathak\(^1\)  
\(^1\)Washington University in Saint Louis, Saint Louis, MO  

3:30 pm  
**Dendritic Cells Sense and Respond to Substrate Geometry**  
Amy Bendell\(^1\), Janis Burkhartt\(^1,2\), and Daniel Hammer\(^1\)  
\(^1\)University of Pennsylvania, Philadelphia, PA,  
\(^2\)Children’s Hospital of Philadelphia, Philadelphia, PA  

3:45 pm  
**Cell-Induced Alignment of Fibrous Extracellular Matrix in 3D Microfabricated Tissues**  
Bryan Nerger\(^1\), Alexandra Piotrowski-Daspit\(^1\), and Celeste Nelson\(^1\)  
\(^1\)Princeton University, Princeton, NJ  

4:00 pm  
**Regulation of Mitochondrial Function by Matrix Elasticity in Engineered Cardiac Tissues**  
Davi M. Lyra-Leite\(^1\), Nathan Cho\(^1\), Nethika R. Ariyasinghe\(^1\), Andrew P. Petersen\(^1\), and Megan L. McCain\(^1,2\)  
\(^1\)Laboratory for Living Systems Engineering, University of Southern California, Los Angeles, CA,  
\(^2\)Keck School of Medicine of USC, Los Angeles, CA  

4:15 pm  
**Substrate Stiffness Modulates Rho/ROCK Expression in Human Keratinocytes**  
Hoda Zarkoob\(^1\), Sathivel Chinnathambi\(^1\), Spencer Van Dorn\(^1\), Jon Reed\(^1\), John Selby\(^1\), and Edward Sander\(^1\)  
\(^1\)The University of Iowa, Iowa City, IA,  
\(^2\)SRQ Bio, Inc., Sarasota, FL  

4:30 pm  
**Microtubule-Targeting Agents Alter Glioma Cell Stiffness-Sensing Behaviors**  
Louis Prahl\(^1\), Patrick Bangasser\(^1\), Mahya Hemmat\(^1\), Steven Rosenfeld\(^2\), and David Odde\(^1\)  
\(^1\)University of Minnesota, Minneapolis, MN,  
\(^2\)Cleveland Clinic, Cleveland, OH  

**OP-Thurs-3-2**  
**Auditorium 2**  
**Track: Cancer Technologies**  
**Cancer Immunengineering**  
*Chairs:* Ankur Singh, Mathumai Kanapathipillai  

3:15 pm  
**Microenvironment Induced Impairments of T-cell Mechano-sensing of Melanoma Antigens**  
Cheng Zhu\(^1\), Zhou Yuan\(^1\), Nathan Rohrer\(^1\), Prithviraj Jothikumar\(^1\), and Susan N. Thomas\(^1\)  
\(^1\)Georgia Institute of Technology, Atlanta, GA  

3:30 pm  
**Precision Glycocalyx Editing as a Strategy for Cancer Immunotherapy**  
Elliot Woods\(^1\)  
\(^1\)UC Berkeley, Burlingame, CA  

3:45 pm  
**Engineering Artificial Lymph Nodes**  
John Hickey\(^1\), Hai-Quan Mao\(^1\), and Jonathan Schneck\(^1\)  
\(^1\)Johns Hopkins University, Baltimore, MD  

4:00 pm  
**Cell Membrane-Inserting Amphiphilic Bioconjugates for Enhancing Immunotherapies in Cancer**  
Michael Zhang\(^1,2\), Kelly Moynihan\(^2\), Llian Mabardi\(^2\), Debra Van Egeren\(^2\), Darrell Irvine\(^2\), and Gregory Szeto\(^1,3\)  
\(^1\)University of Maryland Baltimore County, Baltimore, MD,  
\(^2\)Koch Institute for Integrative Cancer Research, MIT, Cambridge, MA,  
\(^3\)Marlene and Stewart Greenebaum Cancer Center, University of Maryland, Baltimore, Baltimore, MD  

4:15 pm  
**Single-step Nanoparticle Antigen Presentation System for Tumor Immunotherapy**  
Fredrick Kohlhapp\(^1\), Brent Chesson\(^2\), Erica Huelsman\(^2\), Arman Nabatiyan\(^1\), Jai Rudra\(^4\), and Andrew Zloza\(^1\)  
\(^1\)Rutgers Cancer Institute of New Jersey, New Brunswick, NJ,  
\(^2\)Rutgers Cancer Institute of New Jersey, Galveston, TX,  
\(^3\)Rush Medical University, Chicago, IL,  
\(^4\)University of Texas Medical Branch, Galveston, TX  

4:30 pm  
**Engineering Therapeutic T Cells that Activate by Photothermal Triggers**  
Ian Miller\(^1,2\), Joe Maenza\(^1\), Jason Weis\(^1\), and Gabriel Kwong\(^1,2\)  
\(^1\)Georgia Institute of Technology, Atlanta, GA,  
\(^2\)Emory University, Atlanta, GA
<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenters</th>
<th>Affiliations</th>
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<tbody>
<tr>
<td>3:15 pm</td>
<td>Hemodynamics Regulates Endothelial Glycocalyx Correlating to Modulation of Key Endothelial Functions—INVITED</td>
<td>Ming Cheng¹, Solomon Mensah¹, Ian Harding¹, and Eno Ebong¹</td>
<td>¹Northeastern University, Boston, MA</td>
</tr>
<tr>
<td>3:45 pm</td>
<td>A Novel Single-Beat Approach to Assess Right Ventricular Systolic Function in Pulmonary Hypertension</td>
<td>Alessandro Bellafiori¹, Eric Dinges², Rebecca Vanderpool³, Melanie Brewis⁴, Andrew Peacock⁴, Sanjiv Shah⁴, and Naomi Chesler²</td>
<td>¹San Jose State University, San Jose, CA, ²University of Wisconsin-Madison, Madison, WI, ³University of Pittsburgh, Pittsburgh, PA, ⁴Pulmonary Vascular Unit, Glasgow, United Kingdom, ⁵Northwestern University, Chicago, IL</td>
</tr>
<tr>
<td>4:00 pm</td>
<td>Exercise Decreases Arterial Stiffness and Mediates Effects of A High-Fat, High-Sugar Diet</td>
<td>Julie Kohn¹, Jenny Ma¹, Sweta Modi¹, Julian Azar¹, Adeline Chen¹, Stephanie Cheng¹, and Cynthia Reinhart-King¹</td>
<td>¹Cornell University, Ithaca, NY</td>
</tr>
<tr>
<td>4:15 pm</td>
<td>Role of Dobutamine in Coronary Blood Flow-Myocardial Volume Relationships: In Vivo Assessment with Sonomicrometry</td>
<td>John Stendahl¹, Nabil Boutagy¹, Nriposh Parajuli², Allen Lu¹, Imran Alkhair³, Melissa Eberle¹, Ben Lin¹, Lawrence Staib², James Duncan², and Albert Sinusas¹</td>
<td>¹Yale School of Medicine, New Haven, CT, ²Yale School of Engineering and Applied Science, New Haven, CT</td>
</tr>
<tr>
<td>4:30 pm</td>
<td>Average Aneurysm Wall Stress and Displacement in the Common Carotid Artery Increase with an Increase in Aneurysm Size: Initial Results using Fluid-Structure Interaction Simulations</td>
<td>Simon Kudernatsch¹, Sampat Nidadavolu¹, and Donald R. Peterson¹²</td>
<td>¹Texas A&amp;M University, College Station, TX, ²Texas A&amp;M University–Texarkana, Texarkana, TX, ³CD-Adapco, Melville, NY</td>
</tr>
<tr>
<td>3:15 pm</td>
<td>Gradient Biomaterials in Osteochondral and Trachea Defect Repair—INVITED</td>
<td>Michael Detamore¹</td>
<td>¹University of Kansas, Lawrence, KS</td>
</tr>
<tr>
<td>3:45 pm</td>
<td>Establishing Mechanically Active Synthetic Mucosal Interface in A Multi-Well Plat</td>
<td>Abhinav Sharma¹, Neil Forbes¹²,³, and Jungwoo Lee¹²,³</td>
<td>¹University of Massachusetts Amherst, Amherst, MA, ²Institute for Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA</td>
</tr>
<tr>
<td>4:00 pm</td>
<td>Osteotendinous Differentiation and Interfacial Toughening of A Multi-Compartment Collagen Scaffold</td>
<td>William Grier¹, Laura Mozdzen¹, and Brendan Harley¹</td>
<td>¹University of Illinois at Urbana-Champaign, Urbana, IL</td>
</tr>
<tr>
<td>4:15 pm</td>
<td>Hydrogel Platform for Modeling the Dermoeadermal Junction In Vitro</td>
<td>Jangwook Jung¹, Wei-Han Lin¹, Jakub Tolar¹, and Brenda Ogle¹</td>
<td>¹University of Minnesota-Twin Cities, Minneapolis, MN</td>
</tr>
<tr>
<td>4:30 pm</td>
<td>Localization and Quantification of Mineral Deposition at the Engineered Osteochondral Interface Following Three and Seven Days of Double Diffusion</td>
<td>Andreea Teodora Dinescu¹, Amy Chung¹, Esther Cory¹, and Robert Sah¹</td>
<td>¹University of California-San Diego, La Jolla, CA</td>
</tr>
<tr>
<td>3:15 pm</td>
<td>Translation of Conformal Islet Encapsulation and Implementation of Nanocarriers-Based Refinements</td>
<td>Vita Manzoli¹,², Diana Velluto¹, Maria M. Abreu¹, Freddy Gonzalez Badillo¹, and Alice A. Tomei¹³</td>
<td>¹Diabetes Research Institute–University of Miami–Miller School of Medicine, Miami, FL, ²Department of Electronics, Information and Bioengineering–Politecnico di Milano, Milano, Italy, ³Department of Biomedical Engineering–University of Miami, Coral Gables, FL</td>
</tr>
</tbody>
</table>
3:30 pm  Optogenetic Regulation of Insulin Secretion in Pancreatic Cells  
Fan Zhang1 and Emmanuel Tzanakakis1,2  
1Tufts University, Medford, MA, 2Tufts Medical Center, Boston, MA

3:45 pm  Engineering a Long-term and Highly Functional 3D Human Liver Model Using Silk Scaffolds  
David Kukla1, Salman Khetani2, Whitney Stoppel1, and David Kaplan2  
1University of Illinois at Chicago, Chicago, IL, 2Tufts University, Medford, MA

4:00 pm  Achieving Native Cartilage Compressive Properties in Engineered Neocartilage  
Wendy Brown1, Grayson DuRaine2, Heenam Kwon1, Jerry Hu1, and Kyriacos Athanasiou1  
1University of California Davis, Davis, CA, 2Oregon Health & Science University, Portland, OR

4:15 pm  Smart Self-Modulatory Release System Based on Bioactive Coating Modified 3D Printed Perfused Scaffold for Vascularized Bone Regeneration  
Haitao Cui1, Wei Zhu1, Benjamin Holmes1, Michael Plesniak1, and Lijie Grace Zhang1  
1The George Washington University, Washington, DC

4:30 pm  Spatially Organized Microtissue Assemblies for Salivary Gland Tissue Engineering  
Tugba Ozdemir1, Dakota Kelly1, Eric Fowler1, Daniel Zakheim1, Daniel A. Harrington2, Robert L. Witt1,2,3, Mary C. Farach-Carson1,2, Swati Pradhan-Bhatt1,4, and Xinqiao Jia1  
1University of Delaware, Newark, DE, 2Rice University, Houston, TX, 3Thomas Jefferson University, Philadelphia, PA, 4Helen F. Graham Cancer Center & Research Institute, Christiana Care, Newark, DE

OP-Thurs-3-7  Room 101B  
Track: Cancer Technologies  
Precision Medicine and Biomarkers  
Chairs: Farhan Chowdhury, Michael King

3:15 pm  Every Cancer Patient Deserves an Equation: Predicting Survival from Patient-Specific Models —INVITED  
Kristin Swanson1, Corbin Rayfield2, Fillan Grady3, Andrea Hawkins-Daarud3, Pamela Jackson3, Eduardo Carrasco1, and Bernard Bendok3  
1Mayo Clinic Arizona, Phoenix, AZ, 2Mayo Clinic, Scottsdale, AZ, 3Mayo Clinic, Phoenix, AZ

3:30 pm  Key Gene Mutations for Increasing Migration of Brain Cancer Cells via Confinement  
Loan Bui1, Alissa Hendrick1, Tamara Hill1, Richard Leviner1, and Young-Tae Kim1  
1University of Texas at Arlington, Arlington, TX

3:45 pm  Development of Assays for Detecting Methylation in Cell-Free DNA at Single Copy Sensitivity and Single CpG-Site Resolution  
Pornpat Athamanolap1, Thomas II Pisanic1, and Tza-Huei Wang1  
1Johns Hopkins University, Baltimore, MD
**Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3**

**4:00 pm**
Focused Ultrasound Reprograms Ethanol-Treated Prostate Cancer Cells Back to Normal
Heng Yu¹, Hakm Murad¹, Daishen Luo¹, and Damir Khismatullin¹
¹Tulane University, New Orleans, LA

**4:15 pm**
Targeted Nanosystems as Precision Tools for Cancer Diagnosis and Therapy
Ester Kwon¹, Jaideep Dudani¹, Candice Gurbatri¹, and Sangeeta Bhata¹
¹Massachusetts Institute of Technology, Cambridge, MA

**4:30 pm**
Next-generation Sequencing Reveals Distinct Genetic Features of Mechanically Isolated Tumorigenic Cells
Farhan Chowdhury¹, Michael Saul², and Taekjip Ha³
¹Southern Illinois University Carbondale, Carbondale, IL, ²University of Illinois at Urbana-Champaign, Urbana, IL, ³Johns Hopkins University, Baltimore, MD

**OP-Thurs-3-8 Room 101C**
Tracks: Biomechanics, Tissue Engineering
Human Performance/Sports Biomechanics

**3:15 pm**
Voluntary Head Movements Exceed Football Impact Rotational Velocities Without Neurological Deficit
Fidel Hernandez¹, Jared Ostdiek¹, Alec McGlaughlin¹, Matt Garelli¹, and David Camarillo¹
¹Stanford University, Stanford, CA

**3:30 pm**
Comparison of Pitching and Long-Toss Kinetics in Professional Baseball Players
Janelle Cross¹, Roger Caplinger², and William Raasch¹²
¹Medical College of Wisconsin, Milwaukee, WI, ²Milwaukee Brewers Baseball Club, Milwaukee, WI

**3:45 pm**
Evaluation of Head Impact Exposure in Youth Football Practice Drills
Mireille Kelley¹, Joeline Kane², Mark Espeland², Logan Miller³, Joel Stitzel¹, and Jillian Urban¹
¹Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²Wake Forest University, Winston-Salem, NC, ³University of Virginia, Charlottesville, VA

**4:00 pm**
Comparison of Objective Rating Techniques vs. Expert Opinion In The Validation Of Computational Human Body Models
Matthew Davis¹, Bharath Koya¹, Jeremy Schap¹, and F. Scott Gayzik¹
¹Wake Forest School of Medicine, Winston-Salem, NC

**4:15 pm**
Quantitative Assessment of Falls for Humans in a Safety Harness
Gordon Cooke¹² and Arthur Ritter²
¹US Army Armament Research, Development and Engineering Center, Picatinny Arsenal, NJ, ²Stevens Institute of Technology, Hoboken, NJ

**4:30 pm**
Can Muscle Volume Be a Predictor of Motor Performance?
Thang Tran¹, Katherine Knaus¹, Peter Frank¹, Geoffrey Handsfield¹, Joseph Hart¹, and Silvia Blemker¹
¹University of Virginia, Charlottesville, VA

**OP-Thurs-3-9 Room 101D**
Track: Stem Cell Engineering
Directing Stem Cell Differentiation II

**3:15 pm**
Cell-free Synthetic Vascular Grafts: A Blank Slate to Study Host Cell Infiltration and Transformation—INVITED
Yadong Wang¹, Kee-Won Lee¹, Liwei Dong¹, Chelsea Stowell¹, Mario Solari¹, and Vijay Gorantla¹
¹University of Pittsburgh, Pittsburgh, PA

**3:45 pm**
Differentiation of V2a Interneurons From Human Pluripotent Stem Cells
Jessica Butts¹², Dylan McCreedy¹, Federico Mendoza-Camacho¹, Tracy Hookway¹, Praveen Taneja¹, Linda Noble-Haeusslein³, and Todd McDevitt¹³
¹Gladstone Institutes, San Francisco, CA, ²Graduate Program in BioEngineering University of California San Francisco and Berkeley, San Francisco, CA, ³University of California–San Francisco, San Francisco, CA

**4:00 pm**
Nanotopography Promoted Neuronal Differentiation of Human Induced Pluripotent Stem Cells
Kai Wang¹, Liqing Song¹, Yan Li¹, and Yong Yang¹
¹West Virginia University, Morgantown, WV, ²Florida State University, Tallahassee, FL

**4:15 pm**
Maintenance of Neural Progenitor Cell Stemness in 3D Hydrogels Requires Matrix Remodeling
Christopher Madl¹, Ruby Dewi¹, Cong Dinh¹, Kyle Lampel², Duong Nguyen³, Annika Enejder¹, and Sarah Heilshorn¹
¹Stanford University, Stanford, CA, ²University of Virginia, Charlottesville, VA, ³Chalmers University of Technology, Gothenburg, Sweden

**4:30 pm**
Derivation of Cortical Spheroids from Human Induced Pluripotent Stem Cells in a Suspension Bioreactor
Yuanwei Yan¹, Liqing Song¹, and Yan Li¹
¹Florida State University, Tallahassee, FL
OP-Thurs–3–10  Room 101E
Track: Biomaterials*

Biomaterial Scaffolds II

Chairs: Jeffrey Jacot, Guohao Dai

3:15 pm  
A Tissue-specific Matrix-incorporated Electrospun Scaffold for Meniscus Tissue Engineering

Jinglei Wu1, Cancan Xu1, Xingjian Gu1, and Yi Hong1
1University of Texas at Arlington, Arlington, TX

3:30 pm  
Cardiac and Musculoskeletal Tissue Engineering using Cell- Laden Conductive Fibers

Afsoon Fallahi1, Iman Yazdi1, Ali Tamayol1, and Ali Khademhosseini1
1Harvard Medical School, Cambridge, MA

3:45 pm  
In Vivo Study of Gold Nanoparticle-Collagen Gel For Soft Tissue Augmentation

Sheila Grant1, Jiaxun Zhu2, Robert Brooks2, Dale DeVore2, and David Grant1
1University of Missouri, Columbia, MO, 2Eternogen, LLC, Columbia, MO

4:00 pm  
Development of an Electrospun Scaffold with Tailorable Void Space for Dermal Wound Regeneration

Ryan Clohessy1, Karolina Stumbraite1, Barbara Boyan1,2, and Zvi Schwartz1,3
1Virginia Commonwealth University, Richmond, VA, 2Georgia Institute of Technology, Atlanta, GA, 3University of Texas Health Science Center at San Antonio, San Antonio, TX

4:15 pm  
Hand-spun Micro/nanofibers for Cartilage Regeneration

Mingkun Wang1, Chunxiao Cui1, Mazen Ibrahim2, John Lawrence2, Maurizio Paci1, and Li-Hsin Han1
1Drexel University, Philadelphia, PA, 2Children’s Hospital of Philadelphia, Philadelphia, PA

4:30 pm  
Three-Dimensionally Templated Hydrogels for Peripheral Nerve Injury Repair

Christopher Lacko1, Stacy Porvasnik1, Monica Wall1, Andrew Garcia1, Carlos Rinaldi1, and Christine Schmidt1
1University of Florida, Gainesville, FL

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

OP-Thurs–3–11  Room 200E
Tracks: Cardiovascular Engineering, Tissue Engineering

Cardiovascular Tissue Engineering I

Chairs: Jordan Miller, Josephine Allen

3:15 pm  
Fundamental Questions about Lymphatic Biology and Implications for Tissue Engineering—INVITED

Walter Murfee
1Tulane University, New Orleans, LA

3:45 pm  
Heterogeneities in Vascular Stiffness Impact Endothelial Monolayer Integrity

Jacob VanderBurgh1, Julie Kohn1, and Cynthia Reinhart-King1
1Cornell University, Ithaca, NY

4:00 pm  
Tissue Engineering Arterioles: The Role of Intraluminal Fluid-Derived Forces

Mahama Traore1, Richard Hongyi Li1, and Steven George1
1Washington University in Saint Louis, Saint Louis, MO

4:15 pm  
Preventing Progression to Heart Failure: Anisotropic, Acellular, Silk-ECM Patches for Treatment of Myocardial Infarction

Whitney Stoppel1, Kelly Sullivan1, Jonathan Grasman1, Monique Foster1, David Kaplan1, and Lauren Black1
1Tufts University, Medford, MA

4:30 pm  
Directing Vascular Regeneration In-Situ

Randall Smith Jr.1, Daniel Swartz2, and Stelios Andreadis1,4
1SUNY at Buffalo, Buffalo, NY, 2Angiograft, LLC, Buffalo, NY, 3University at Buffalo, SUNY, Buffalo, NY, 4Center of Excellence in Bioinformatics and Life Sciences, Buffalo, NY

OP-Thurs–3–12  Room 200F
Track: Nano and Micro Technologies

Microscale Diagnostic Technologies

Chairs: Brian Plouffe, Nilay Chakraborty

3:15 pm  
Innovative Healthcare is in the Palm of Your Hand—INVITED

Luke Lee1
1California Institute of Quantitative Biosciences UC Berkeley, Berkeley, CA

3:45 pm  
Smartphone-based Optofluidic Exosome Diagnostic for Concussion Recovery

Jina Ko1, Matthew Hemphill1, David Gabrieli1, Leon Wu1, Ravi Yelleswarapu1, Gladys Lawrence1, Wesley Pennycooke1, Anup Singh1, Dave Meaney1, and Dave Issadore1
1University of Pennsylvania, Philadelphia, PA

Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

4:00 pm
Developing an In Vitro Platform to Study the Dormant Liver Stages of Plasmodium Vivax Malaria
Nil Gural1, Breanna Stillo1, Ani Galstian1, Alex Miller2, Rapathbhorn Patrapuvich3, Jetsumon Sattabongkot3, Sandra March1, and Sangeeta N. Bhatia1,2
1Massachusetts Institute of Technology, Cambridge, MA, 2Broad Institute of MIT and Harvard, Cambridge, MA, 3Howard Hughes Medical Institute, Cambridge, MA

4:15 pm
Spatially Mapped Gene Expression Analysis from Tissue
Anurup Ganguli1, Gregory Damhorst1, Carlos Duarte1, Tanmay Ghonge1, Farhad Kosari2, Christian Konopka1, Wawrzyniec Dobrucki1, and Rashid Bashir1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Mayo Clinic Cancer Center-Research, Rochester, MN

4:30 pm
MAPS- Magnetically Actuated Protease Sensors For In Vivo Tumor Profiling
Simone Schurle1, Jaideep S. Dudani1, Michael G. Christiansen1, Polina Anikeeva1, and Sangeeta Bhata1
Massachusetts Institute of Technology, Cambridge, MA

OP-Thurs-3-13 | Room 200D
Track: Bioinformatics, Computational and Systems Biology
Metabolic Models

Chairs: Ranjan Dash, Stacey Finley

3:15 pm
Engineering Mammalian Cells Using Systems Biology Models to Enhance Biopharmaceutical Development—INVITED
Nathan Lewis1
1University of California, San Diego, La Jolla, CA

3:45 pm
Cost Based Methods for the Analysis of Genome-wide Human Metabolic Reconstructions
Andre Schultz1 and Amina Qutub1
Rice University, Houston, TX

4:00 pm
Integration of Comparative Toxicogenomics Data to Generate Biomarker Predictions with Rat and Human Metabolic Networks
Kristopher Rawls1, Edik Blais1, Glynis Kolling1, and Jason Papin1
University of Virginia, Charlottesville, VA

4:15 pm
Modeling the Detailed Kinetics and Nitric Oxide Inhibition of Mitochondrial Cytochrome c Oxidase
Venkat Pannala1, Amadou Camara1, Sait Audi2, and Ranjan Dash1
Medical College of Wisconsin, Milwaukee, WI, Marquette University, Milwaukee, WI

4:30 pm
Systems Analysis Identifies Metabolic Components to Antibiotic Susceptibility and Tolerance
Jason Yang1,2, Sarah Wright1,2, and James Collins2,3
1Massachusetts Institute of Technology, Cambridge, MA, 2Broad Institute of MIT and Harvard, Cambridge, MA

OP-Thurs-3-14 | Room 200G
Track: Nano and Micro Technologies
Microfluidics for the Diagnostic and Monitoring of Viral Infections

Chairs: Evan Scott, Kim SeungHyun

3:15 pm
A Field-Portable Inertio-Magnetic Microfluidic Cell Sorter for Rapid Discovery of Zika-Specific Antibodies
Aniruddh Sarkar1,2, Giuseppe Lofano1, Sophie Blackburn1, Jongyoon Han1, and Galit Alter1
1Harvard Medical School, Cambridge, MA, 2Massachusetts Institute of Technology, Cambridge, MA

3:30 pm
Detection of Intact Influenza Virus from Clinical Samples Using Computationally Designed Affinity Proteins
Caitlin Anderson1, Eva-Maria Strauch1, Rosemichelle Marzan1, David Baker1, and Paul Yager1
1University of Washington, Seattle, WA

3:45 pm
Leveraging Implantable Nanofluidic Technology for Longterm HIV Prophylaxis
Robert Hood1, Priya Jain1, and Alessandro Grattoni2
1University of Texas at San Antonio, San Antonio, TX, 2Houston Methodist Research Institute, Houston, TX

4:00 pm
Field-Portable Holographic Microscope for Label-free Detection of Herpes Simplex Virus
Aniruddha Ray1, Ha Ho1, Mustafa Daloglu1, Euan McLeod2, and Aydogan Ozcan1
1University of California, Los Angeles, CA, 2University of Arizona, Tucson, AZ

4:15 pm
Magnetic Nanopore-based Sorting for Ultra-sensitive HIV Viral Load Detection
Nishal Shah1
1University of Pennsylvania, Philadelphia, PA

4:30 pm
Paper-based Device for Gastroenteritis Detection Integrated With Sample Preparation Cartridge
Zhenyuan Lu1,2, Kshitij Ranjan1, Jacob Carrano2, Roland Schneider2, John Carrano2, and Shannon Weigum1
1Texas State University, San Marcos, TX, 2Paratus Diagnostics, LLC, Austin, TX
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

**OP-Thurs–3-15**
**Room 200C**
**Track: Biomedical Imaging and Optics, Biomechanics**
**Imaging Techniques in Biomechanics**

*Chairs: F. Scott Gayzik, Mohammad H. Abedinnasab*

**3:15 pm**

In Vivo Characterization of the Human Skull-Brain Interface using Magnetic Resonance Elastography

Andrew Badachhape1, Ramona Durham1, Brent Efron1, Ruth Okamoto1, Curtis Johnson2, and Philip Bayly1
Washington University in St. Louis, St. Louis, MO,
1University of Delaware, Newark, DE

**3:30 pm**

Quantitative Assessment of Cell Contractility Using Polarized Light Microscopy

Francois Bordeleau1, Joseph Miller1, Wenjun Wang1, and Cynthia Reinhart-King1
1Cornell University, Ithaca, NY

**3:45 pm**

Implementation of a 3D-2D Imaging-Based Approach for Accurate Quantification of Shoulder Motion Using a Clinically-Available Biplane Fluoroscope

Joseph Mozingo1, Mohsen Akbari-Shandiz1, Dixon Magnuson1, Cynthia McCollough1, and Kristin Zhao1
1Mayo Clinic, Rochester, MN

**4:00 pm**

Investigation of In Vivo Human Brain Motion Under Head Accelerations

Kaveh Laksari1, Bradley Hammoor1, Leland Pung2, Kerstin Mueller1, Huy Do1, and David Camarillo1
1Stanford University, Stanford, CA, 2Siemens Medical Solutions Inc., Malvern, PA

**4:15 pm**

Forces Across Cell-Cell Junctions Contribute to Lumen Formation and Homeostasis in Epithelial Acini—INVITED

Daniel Conway1 and Vani Narayanan1
1Virginia Commonwealth University, Richmond, VA

**4:30 pm**

In Vivo Multi-Frequency Magnetic Resonance Elastography Of The Human Brain: Which Frequencies Matter?

Mehmet Kurt1, Han Lv1,2, Kaveh Laksari1, Lyndia Wu1, Karla Epperson1, Kevin Epperson1, Anne Sawyer1, David Camarillo1, Kim Butts Pauly1, and Max Wintermark1
1Stanford University, Stanford, CA, 2Beijing Friendship Hospital, Beijing, China, People’s Republic of

**OP-Thurs–3-16**
**Room 200H**
**Track: Drug Delivery**
**Novel Materials and Self Assembly for Drug Delivery**

*Chairs: Kyung Jae Jeong, Roche de Guzman*

**3:15 pm**

Engineering Protease-Responsive Microspheres from Self-Assembled Disordered Proteins

Benjamin Schuster1, Ranganath Parthasarathy1, and Daniel Hammer1
1University of Pennsylvania, Philadelphia, PA

**3:30 pm**

Halide-Gated Molecular Release from Nanoporous Gold Thin Films

Ozge Polat1 and Erkin Seker1
1University of California, Davis, Davis, CA

**3:45 pm**

Design of Self-Assembled Multilayers for Immune Modulation

Boyan Xia1, Lisa Tostanoski1, and Christopher Jewell1,2,3
1University of Maryland-College Park, College Park, MD, 2University of Maryland Medical School, Baltimore, MD, 3Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD

**4:00 pm**

Supramolecular Protein PEGylation

Matthew Webber1
1University of Notre Dame, Notre Dame, IN

**4:15 pm**

Self-Assembly of ssDNA-Amphiphiles into DNA Nanotubes with Controlled Diameters and Lengths

Huihui Kuang1 and Efrosini Kokkoli1
1University of Minnesota, Minneapolis, MN

**4:30 pm**

Polymer Thin Film Device for Immuno-protective Encapsulation of Human Stem Cell Derived Insulin Producing Cells for the Treatment of Type 1 Diabetes

Ryan Chang1, Gaetano Faleo1, Holger Russ1, Matthias Hebrok1, Qizhi Tang1, and Tejal Desai1
1University of California, San Francisco, San Francisco, CA
Thursday, October 6 | 3:15 pm–4:45 pm | Platform Session 3

OP-Thurs-3-17 | Room 200B
Track: Orthopaedic and Rehabilitation Engineering

Intervertebral Disc and Spine

Chairs: Robert Bowles, Beth Winkelstein

3:15 pm
Imaged Based Modeling to Investigate Pathomechanics of Disc Degeneration—INVITED
Dawn Elliott¹, Amy Claeson¹, Brent Showalter¹, Edward Vresilovic², John Peloquin¹, John DeLucca¹, Alexander Wright¹, James Gee¹, and Neil Malhotra³
¹University of Delaware, Newark, DE, ²Pennsylvania State University, Hershey, PA, ³University of Pennsylvania, Philadelphia, PA

3:45 pm
Biomechanical Effect of Ischiofemoral Impingement and Femoral Version on Lumbar Facet Joint Loading
Anthony Khoury¹, Juan Gomez-Hoyos³, Ricardo Schroder², Eric Johnson², Ian Palmer², and Hal Martin²
¹University of Texas Arlington, Dallas, TX, ²Baylor Research Institute, Dallas, TX

4:00 pm
Analysis of Individual and Combined Annulus Fibrosus and Nucleus Pulposus Repair In Vitro
Stephen Sloan, Jr.¹, Devis Galessro², Cynthia Secchieri², and Lawrence Bonassar¹
¹Cornell University, Ithaca, NY, ²Fidia Farmaceutici S.p.A., Padua, Italy

4:15 pm
Evidence of Serum Response Factor Signaling In Nucleus Pulposus Cells of The Intervertebral Disc
Bailey Fearing¹, Priscilla Hwang¹, Ruhang Tang¹, Devin Bridge¹, Lufang Jing¹, Michael Kelly², Munich Gupta², and Lori Setton¹
¹Washington University in St. Louis, St Louis, MO, ²Washington University School of Medicine, St Louis, MO, ³Duke University, Durham, NC

4:30 pm
Epigenome Editing of Nociceptive Neurons Abolishes Degenerative IVD Induced Sensitization
Joshua Stover¹, Niloofar Farhang¹, Brandon Lawrence¹, and Robby Bowles¹
¹University of Utah, Salt Lake City, UT

OP-Thurs-3-18 | Room 200I
Track: Biomedical Engineering Education (BME)

Entrepreneurship and Innovation in Biomedical Engineering

Chairs: Kunal Mitra, Subrata Saha

3:15 pm
Educating Entrepreneurially Minded Biomedical Engineers—INVITED
Douglas Melton¹
¹The Kern Family Foundation, Waukesha, WI

3:45 pm
Helping Students Develop Strategies for Dealing with Unethical Behavior in the Workplace
Jay Goldberg¹ and Kristina Ropella¹
¹Marquette University, Milwaukee, WI

4:00 pm
MedTech Innovation Course: Improvement and Versatility of the Model
Jawad Ali¹, Heather Haeberle¹, Sarah Mayes³, and Margo Cousins¹
¹University of Texas at Austin, Dell Medical School, Austin, TX, ²University of Texas at Austin, Austin, TX, ³Alafair Biosciences, Austin, TX

4:15 pm
Fostering Entrepreneurial Mindset in Biomedical Engineering Programs
Mansoor Nasiri¹ and Eric Meyer¹
¹Lawrence Technological University, Southfield, MI

4:30 pm
Encouraging Curiosity, Connections and the Creation of Value in a Materials/Biomaterials Sequence: Part 1: Materials Science
Gary Bledsoe¹ and Silviya Zustiak¹
¹Saint Louis University, St Louis, MO

Thursday, October 6
3:15 pm–4:45 pm
Platform Session 3

Thurs-3-19 | Room 200J
Track: Neural Engineering

Peripheral Nerve Stimulation and Repair

Chairs: Treena Arinzech, Erin Purcell

3:15 pm
Human Endothelial Cells Secrete Neurotropic Factors to Direct Axonal Growth
Jonathan Grasman¹ and David Kaplan¹
¹Tufts University, Medford, MA

3:30 pm
Physical Therapy Combined with a PCL/HA Nanofiber Conduit for Enhanced Peripheral Nerve Repair
Tonya Whitehead¹, Jean Peduzzi², Assadollah Mazhari³, Chaoyang Chen¹, John M. Cavanaugh¹, and Harini G. Sundararaghavan¹
¹Wayne State University, Detroit, MI, ²Wayne State University School of Medicine, Detroit, MI
3:45 pm
Neuronal and Glial Optogenetic Stimulation for Accelerating Nerve Growth
Seongjun Park¹, Ritchie Chen¹, Alex Senko¹, Jueun Lee¹, Jung Yun Yoon¹, and Polina Anikeeva¹
¹Massachusetts Institute of Technology (MIT), Cambridge, MA

4:00 pm
Ultrasound Stimulation for Peripheral Nerve Repair
Emily Ashbolt¹, Marissa Puzan¹, Daniel Ventre¹, and Abigail Koppes¹
¹Northeastern University, Boston, MA

4:15 pm
Osseointegrated Neural Interface (ONI): A Novel Approach to Peripheral Nerve Interfaces.
Aaron Dingle¹, Joseph Novello¹, Jared Ness¹, Dan Hellenbrand¹, Lisa Krugner-Higby¹, Brett Nemke¹, Yan Lu¹, Sarah Brodnick¹, Mark Markel¹, David Goodspeed¹, Justin Williams¹, and Samuel Poore¹
¹University of Wisconsin, Madison, WI

4:30 pm
An Electro-Stimulation Integrated Device for Pain Management of Peripheral Neuropathy
John MacDonald¹, Rashad Armbrister¹, and Udayan Das¹
¹DeVry University, Chicago, IL

SPECIAL SESSION
3:15 pm–4:45 pm Room 208CD
Engineering Low-Cost Solutions to Address Health Care Disparities
Chairs: Gilda Barabino, Cato Laurencin
This session will explore the role of biomedical engineering in addressing health disparities and more specifically the application of biomedical technologies in developing countries, with an eye toward their adaptation to address issues here in the U.S. Dr. Rebecca Richards-Kortum will open the session and be followed by a panel discussion of the wide range of opportunities for engineers interested in solving health disparities through novel low-cost engineering designs. Winners of the 2016 BME Innovation and Career Development Travel Award will be announced at the session.
**Track: Biomaterials**

**Hydrogel Biomaterials**

**Th-1**
Temperature and pH Dependent Degradation of AH6 3:1 and AH6 5:1 Poly(beta-amino ester) Polymers
Alexander Chen¹ and David Puleo¹
¹University of Kentucky, Lexington, KY

**Th-2**
Polypyrrole Poly-HEMA Based Hydrogels and Custom Culture Plate Design For Stem Cells Differentiation Induction Through Electric Field Application
Vincent Duriauc², Christian Kotanen¹, and Anthony Guiseppi-Elie¹
¹Texas A&M, College Station, TX, ²University of Montpellier, Montpellier, France

**Th-3**
Nitric Oxide Releasing Fibrin Cleavage Products for Incorporation into Injectable PEG Hydrogels
Breaanne Spalding¹, Connor McCarthy¹, Bruce Lee¹, and Rupak Rajachar¹
¹Michigan Technological University, Houghton, MI

**Th-4**
Development of a Novel Nitric Oxide Releasing Fibrin Microgel Composite Hydrogel for Tendon Repair
Carly Joseph¹, Connor McCarthy¹, Hannah Fisher¹, Jacob Altscheffel¹, Adam Francis¹, Breaanne Spalding¹, Bruce Lee¹, and Rupak Rajachar¹
¹Michigan Technological University, Houghton, MI

**Th-5**
Optimization and Characterization of Actuating PEG/Acrylic Acid Hydrogels As Artificial Muscles
Daniel Browe¹, Matthew Sze¹, and Joseph Freeman¹
¹Rutgers University, Piscataway, NJ

**Th-6**
Novel Cellular Adhesion Properties on Poly(ethylene glycol) Dimethacrylate Hydrogels
Elizabeth Hernandez², Ann Babcock³, Christina Lochner³, and Derek Doroski³
¹Franciscan University of Steubenville, Hannover, PA, ²Franciscan University of Steubenville, Elk Ridge, MD, ³Franciscan University of Steubenville, Steubenville, OH

**Th-7**
Hydrogen Peroxide Generation and Biocompatibility of Mussel Adhesive Moiety Modified Injectable Hydrogel
Hao Meng¹, Yuan Liu¹, and Bruce Lee¹
¹Michigan Technological University, Houghton, MI

**Th-8**
Fabrication of Injectable Macroporous Alginate Microbeads for Magnetically Actuated Drug Delivery
Jaeyeun Kim¹ and Bom Yi Shin¹
¹Sungkyunkwan University, Suwon, Korea, Republic of

**Th-9**
Self-Assembly of Heterochiral Peptides with Varied Sequence Patterns
Alexey Koyfman¹, Charles Peak², Rajagopal Appavu¹, Akhilesh Garbaraw¹, and Jai Rudra¹
¹University of Texas Medical Branch, Galveston, TX, ²Texas A&M University, College Station, TX

**Th-10**
New Matrix End-Tethering Strategy Supports both Mechano-sensing and Tissue-Mimetic Fiber Remodeling
Jessica Lee¹, Elena Kassianidou¹, James MacDonald¹, Matthew Francis¹, and Sanjay Kumar¹
¹University of California, Berkeley, Berkeley, CA, ²Lawrence Berkeley National Laboratory, Berkeley, CA

**Th-11**
Impedance Characterization of Polyamline Nanofibers Chitosan Composites Using Modified Thin Film Electrodes
John Aggas¹ and Anthony Guiseppi-Elie¹
¹Texas A&M, College Station, TX

**Th-12**
Self-healing of Thermal-induced Protein Hydrogel
Jun Chen¹, Xiaoyu Ma¹, and Yu Lei¹
¹University of Connecticut, Storrs, CT

**Th-13**
Fabrication of Multi-Compartmental Hydrogel Microparticles by Sequential Electrospinning Combined with Photopatterning Process
Kanghee Cho¹, Sung Ho Cha¹, Byung Ju Yun¹, Byoungyong Yoo¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

**Th-14**
Development of Hydrogel Therapeutic Delivery System for Traumatic Optic Neuropathy
Katelyn Swindle-Reilly¹, Nguyen Tram¹, Matthew Reilly¹, Kirstin Jones¹, and Randolph Glickman¹
¹The Ohio State University, Columbus, OH, ²University of Texas Health Science Center at San Antonio, San Antonio, TX

**Th-15**
Circular Dichroism Spectroscopy: A New Approach To Monitor Collagen Fibrillogenesis
Kathryn Drzewiecki¹, Daniel Grisham¹, Vikas Nanda¹, and David Shreiber¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

**Th-16**
 Fibroblast to Myofibroblast Transitions In Hydrogels of Varying Stiffness
Anuraag Boddu palli¹ and Katie Bratlie¹
¹Iowa State University, Ames, IA

**Th-17**
Tissue Derived ECM Hydrogels: Using Matrix Solubilization to Control Material Properties
Robert Pouliot¹, Patrick Link¹, Nabil Mikhail¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

**Th-18**
Influence of Storage Conditions On The Physical Properties And Protein Release Of Polyethylene Glycol Hydrogel Microspheres
Saahil Sheth¹, Era Jain¹, Kristen Polito¹, Scott Sell¹, and Silviya Zastik¹
¹Saint Louis University, St Louis, MO

**Th-19**
Collagen:Fibrin Hydrogels As Myogenic Grafts: Effects Of Blends And Mechanical Conditioning
Sarah Stagg¹, Joo Ong¹,², Christopher Rathbone¹, and Teja Guda¹,²
¹University of Texas at San Antonio, San Antonio, TX, ²University of Texas Health Science Center, San Antonio, TX

**Th-20**
Mechanical Property of Surface Crosslinked Super Absorbent Polymer
Sooho Chang¹, Minsu Kim¹, Donyoung Kang¹, Seunghee Oh¹, Won-Gun Koh¹, and Hyungsuk Lee¹
¹Yonsei University, Seoul, Korea, Republic of

**Th-21**
Soft, Highly Compressive, and Conductive Cryogels for Use as Neuroprosthetic Electrodes
Rosa Ghatee¹, Anita Tolouei¹, Walter Besio¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI
Th-22
Comparative Study of Ultrasound Induced and Naturally Self-assembled Silk Fibroin-Wool Keratin Hydrogel Biomaterials
Phuong-Trang Vu¹, Ye Xue¹, and Xiao Hu¹
¹Rowan University, Glassboro, NJ

Th-23
Construction of Tissue Adhesive Based on Polymer-Inorganic Nanoparticle Interactions Promoting Cellular Infiltration
Yuan Liu¹, Hao Meng¹, and Bruce Lee¹
¹Michigan Technological University, Houghton, MI

Th-24
A Heterogeneous Fibrosis Model for Cancer Mechanobiology
Dave Dingal¹, Yuntao Xia², and Dennis Discher²
¹Michigan Technological University, Houghton, MI, ²University of Pennsylvania, Philadelphia, PA

Track: Biomechanics
Computational and Multiscale Modeling in Biomechanics

Th-25
Hemodynamic Changes during Growth and Rupture of a Middle Cerebral Artery Aneurysm
Alena Sejkorová¹,², Kendall Dennis¹, Susheil Uthamaraj², Emily Nordahl³, David Kallmes⁴, Giuseppe Lanzino⁵, Ales Hejčl¹, and Dan Dragomir Daescu²
¹Masaryk Hospital, Ústí nad Labem, Czech Republic, ²Mayo Clinic, Rochester, MN, ³Rowan University, Glassboro, NJ

Th-26
Virtual Surgery Study of Changes in Nasal Aerodynamics After Inferior Turbine Reduction in Patients with Nasal Obstruction
Azadeh A.T. Borojeni¹, Dennis O. Frank-Ito ², Julia S. Kimbell³, John S. Rhee¹, and Guilherme J. M. Garcia⁴
¹Masaryk Hospital, Ústí nad Labem, Czech Republic, ²Mayo Clinic, Rochester, MN, ³University of North Carolina, Chapel Hill, NC

Th-27
Optimized Simulation of Annulus Fibrosis Layers for Finite Element Model of Lumbar Spine: A Parametric and Sensitivity Study
Chaudhry Hassan¹, Yue-Li Sun¹, Elissa Scannapieco¹, Gita Vikram¹, and Yi-Xian Qin¹
¹Stony Brook University, Stony Brook, NY

Th-28
A Finite Element Homogenization Technique for Anisotropic Analysis of Ordered Axons
Daniel Sullivan¹, John Georgiadis², and Assimina Pelegri¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Illinois Institute of Technology, Chicago, IL

Th-29
Regional Residual Stress Analysis of Human Lens Capsule as a Function Of Age
David Zhang¹ and Matthew Reilly²
¹University of Texas at San Antonio, San Antonio, TX, ²The Ohio State University, Columbus, OH

Th-30
Role of The Facet Capsular Ligament in Guiding Lumbar Spinal Motion
Emily Bermell¹, Victor Barocas¹, and Arin Ellingson¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Th-31
Nonlinear Bending Dynamics of a Semiflexible Filament in 3D Brownian Fluctuation
Jyothirmai Simhadri¹ and Preethi Chandran¹
¹Howard University, Washington, DC

Th-32
The Role of Annular Tissues and Intraocular Pressure in Ocular Morphogenesis
Nguyen Tran¹, Katelyn Swindle-Reilly¹, and Matthew Reilly¹
¹The Ohio State University, Columbus, OH

Th-33
Tullio Phenomenon: Pathological Sound-Induced Vertigo
Marta Iversen¹, John Carey¹, Charles Della Santina², Wu Zhou³, Hong Zhu³, and Richard Rabbitt¹
¹University of Utah, Salt Lake City, UT, ²Johns Hopkins University, Baltimore, MD, ³University of Mississippi Medical Center, Jackson, MS

Th-34
Modified Corpectomy Model for Growing-Rods: Validation of Finite Element Analysis
Mary Foltz²,³, Victor Barocas¹, Andrew Freeman³, Joan Bechtold¹, and David Polly¹
¹University of Minnesota, Minneapolis, MN, ²Excelen Center for Bone & Joint Research and Education, Minneapolis, MN, ³Fortus Medical, Minneapolis, MN

Th-35
Probabilistic Distributions of Trabecular Bone Architecture May Reveal Nature’s Design Principles
Matthew Kirby¹, Feng Zhao¹,², and Xiaodu Wang¹
¹University of Texas at San Antonio, San Antonio, TX, ²Beihang University, Beijing, China, People’s Republic of China

Th-36
An In-Situ Approach to Estimate the Layer-Specific Biophysical State of Aortic Valve Intersitial Cells
Rachel Buchanan¹ and Michael Sacks¹
¹The University of Texas at Austin, Austin, TX

Th-37
Using Logarithmic Spirals to Quantify Human Rib Geometry
Sven Holcombe¹, Stewart Wang¹, and James Grotberg¹
¹University of Michigan, Ann Arbor, MI

Track: Bioinformatics, Computational and Systems Biology
Algorithms for Computational/Systems Biology

Th-38
Identifying PET Biomarkers to Predict Conversion Of Mild Cognitive Impairment To Alzheimer’s Disease
Alexandra Berges¹
¹Johns Hopkins University, Baltimore, MD

Th-39
Application of Curve Fitting to Determine Rates of Inhibition of Elastase by Alpha-1 Antitrypsin
Bryan Materi¹, Michael Adenson¹, and Robby Sanders¹
¹Tennessee Technological University, Cookeville, TN

Th-40
Optimizing Tuberculosis Antibiotic Regimens Using a Computational Model of Granuloma Formation
Joseph Cicchese¹, Elsje Pienaar¹, Jennifer Linderman¹, and Denise Kirschner²
¹University of Michigan, Ann Arbor, MI, ²University of Michigan Medical School, Ann Arbor, MI

Th-41
Statistically Robust Detection of Group-Specific Signal from Specificity Determining Positions in Protein Families
Roman Sloutsky¹ and Kristen Naegle¹
¹Washington University in St Louis, St Louis, MO
Quantitative Characterization of Human Cognitive State Using Physiological Parameters
Dong Wang¹, Xinghua Jia¹, Caroline Lieser¹, Matthew Middendorf¹, Scott Galster², and Mingjun Zhang¹
¹Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, ²711th Human Performance Wing, Air Force Research Laboratory, WPAFB, OH

Track: Bioinformatics, Computational and Systems Biology
Dynamics of Biological Systems

Allostatic Breakdown of Multiple Homeostat Systems: A Computational Approach
Alison Acevedo¹ and Ioannis Androulakis¹²
¹Rutgers University, Piscataway, NJ, ²Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ

How Failure Propagates in Aging Tissues: Accelerated Implosion Hypothesis
Daniel Suma¹, Pinar Zorlutuna¹, and Dervis Vural¹
¹University of Notre Dame, Notre Dame, IN

Modeling Mouse Soleus Muscle Contraction
Joseph Palladino¹
¹Trinity College, Hartford, CT

The Role of the Hypothalamic-Pituitary-Adrenal (HPA) Axis In Modulating Seasonal Changes in Immunity
Kamau Pierre¹, Naomi Schlesinger¹, and Ioannis Androulakis¹,²
¹University of Notre Dame, Notre Dame, IN, ²Rutgers University, Piscataway, NJ

Hyperglycemia-induced Multi-layered Genomic Regulation Analysis
Hemang Patel¹ and Mahendra Kavdia²
¹Wayne State University, Detroit, MI, ²Wayne State University, Detroit, MI

Computer-driven Design and Experimental Testing of a Synthetic Microbial Community
Meghan Thommes¹ and Daniel Segre¹
¹Boston University, Boston, MA

Defining Phenotypic Landscapes for Progenitor Cells
Zi Ye¹, Najaf Shah², and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN, ²University of Pennsylvania, Philadelphia, PA

Th-45

Th-46

Th-47

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¹University of Minnesota, Minneapolis, MN, ²University of Pennsylvania, Philadelphia, PA

Th-48

Th-49

Computational Investigation of Bidirectional Cargo Transport in Neurons
Kazuka Ohashi¹, John Fricks¹, and William Hancock¹
¹The Pennsylvania State University, State College, PA

Characterization of Optimal Strategy for Glenn Anastomosis using Statistical Shape Models
Prahlad Menon¹, Craig Benzier¹, and Haifa Hong²
¹Duquesne University, Pittsburgh, PA, ²Shanghai Jiaotong University School of Medicine, Shanghai, China, People’s Republic of China

Track: Bioinformatics, Computational and Systems Biology
Bioinformatics, Computational and Systems Biology—Other/Non-Specified

Th-52

Heterogenic MiRNA Regulation in Hyperglycemia-induced Endothelial Dysfunction
Hemang Patel¹ and Mahendra Kavdia²
¹Wayne State University, Detroit, MI, ²Wayne State University, Detroit, MI

Bioinformatic Insights into Toll-like Receptors in Macrophages
Shakti Gupta¹, Sindhu Raghunandan², Andrew Caldwell¹, Merril Gersten¹, Srinivasan Ramachandran¹, and Shankar Subramaniam¹
¹University of California, San Diego, La Jolla, CA

Integration of Biophysics and Bioinformatics/Data-Driven Models

Th-56

Immersive Visualization for Comparative Viewing of CFD Results with Associated Multiscale Data
John Venn¹, Christopher Larkee², and John LaDisa¹,³
¹Marquette University, Milwaukee, WI, ²Marquette University, Milwaukee, WI, ³Medical College of Wisconsin, Milwaukee, WI

Computational Investigation of Bidirectional Cargo Transport in Neurons
Kazuka Ohashi¹, John Fricks¹, and William Hancock¹
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Prahlad Menon¹, Craig Benzier¹, and Haifa Hong²
¹Duquesne University, Pittsburgh, PA, ²Shanghai Jiaotong University School of Medicine, Shanghai, China, People’s Republic of China

Track: Bioinformatics, Computational and Systems Biology
Bioinformatics, Computational and Systems Biology—Other/Non-Specified

Th-59

Diffusion Model Across a Blood-Brain Barrier Mimic for The Treatment Of Autism Spectrum Disorder
Jamelle Simmons¹, Luke Achenie¹, and Yong Woo Lee¹
¹Virginia Polytechnic Institute and State University, Blacksburg, VA

Computational Model-Driven Design of a Pharmacological Intervention During Muscle Regeneration
Kyle Martin¹, Chris Kegelman¹, Kelley Virgilio¹, Juliana Passipieri¹, George Christ¹, Shayn Peirce¹, and Silvia Blemker¹
¹University of Virginia, Charlottesville, VA

Track: Bioinformatics, Computational and Systems Biology
Bioinformatics, Computational and Systems Biology—Other/Non-Specified

Th-60
**Th-61**
Regenerative Orthopedic Device Materials: Making Nanocomposites via Solid State Shear Pulverization
Sean Devlin¹, Nathan Spangenberg¹, Rohit Batish¹, Daniel Hagaman³, Frank Ji², and Peter Lekes³
¹Temple University, Philadelphia, PA, ²Drexel University, Philadelphia, PA

**Th-62**
Study of Titanium-Zirconium Nanotubes on Commercially Available Roxolid Implants
Sai Bhosle¹, Sweetu Patel², Tolou Shokuhfar¹, and Cortino Sukotjo¹
¹University of Illinois at Chicago, Chicago, IL, ²Michigan Technological University, Chicago, IL

**Th-63**
The Effects of Polymerization Conditions on Biofabricated Chitosan Microbeams in Microfluidics
Santiago Correa¹, Phu Pham¹, Xiaolong Luo¹, and Christopher Raub¹
¹The Catholic University of America, Washington, DC

**Th-64**
The Effects of Multiple Spatial Inhomogeneities of ECM on Directed Cell Migration
Minji Whang¹ and Jungwook Kim¹
¹Sogang University, Seoul, Korea, Republic of

**Th-65**
Understanding Pathogen Microbial Physiology using a Biomimetic Biofilm
Sung-Ho Paek¹, Keith C. Heyde¹, and Warren C. Ruder¹
¹Virginia Tech, Blacksburg, VA

**Th-66**
Assessment of Mechanically Assisted Electrochemical Degradation of Alumina-TiC Composite in an Aqueous Environment
Hetal Maharaja¹
¹Clemson University, Clemson, SC

**Th-67**
Rapid High Resolution Multi-Parameter Characterization of Liposome-Protein Complexes by Nanoparticle Tracking Analysis
Ragy Ragheb¹, Edward Esposito¹, and Duncan Griffiths¹
¹Malvern Instruments, Westborough, MA

**Th-68**
Intercalator-induced Oscillatory Vibration of DNA Modified Micro-cantilever
Shandong Xu¹, Liyuan Ma¹, Shanshan Yuan¹, and Ming Su¹
¹Northeastern University, Boston, MA

**Th-69**
Impact of Lactoferrin and Lysozyme on Microbe Transport in Mucus
Taylor Carlson¹, Jaclyn Lock¹, and Rebecca Carrier¹
¹Northeastern University, Boston, MA

**Th-70**
Dual-Imaging Enabled Platform Biodegradable Scaffolds for Non-Invasive Imaging in Tissue Engineering
Dingyong Shan¹, Zhipeng Liang¹, Yuncong Ma¹, Nanyin Zhang¹, and Jian Yang¹
¹The Pennsylvania State University, University Park, PA

**Th-71**
Probing Biomolecular Interactions of High-density Lipoprotein Mimetic Nanomaterials with Amyloid-beta Peptide for the Treatment of Alzheimer’s Disease
Angel Santiago-Lopez¹, Yoshitaka Sei¹, and Yongtae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

**Th-72**
A Mechanically Tunable Interpenetrating Network of Gelatin-Methacylate and Fibrous Collagen
Anthony Berger¹, Pamela Keeeger¹, and Kristyn Masters¹
¹University of Wisconsin-Madison, Madison, WI

**Th-73**
Prototyping Chip Style Microfluidic Devices for High Performance Fiber Production
Catherine Gruat-Henry¹ and Bradley Hoffmann¹
¹North Dakota State University, Fargo, ND

**Th-74**
Biomimetic Biodegradable Photoluminescent Polymers for Bone Tissue Engineering
Chuying Ma¹ and Jian Yang¹
¹Pennsylvania state university, state college, PA

**Th-75**
Silk-Zein Protein Composite Materials
Dave Jao¹, Ye Xue¹, Joseph Forsy¹, Justin Buchicchio¹, and Xiao Hu¹
¹Rowan University, Glassboro, NJ

**Th-76**
Adhesion and Alignment of Stem Cells on a Spider Silk Scaffolds after UV Sterilization
Katherine Hafner¹, Olivia Ross¹, Hannah Maeser¹, John Catoe¹, Mariann Kennedy¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

**Th-77**
Functionalization of Electrospun 3D Nanofibrous Polycaprolactone Scaffolds via Polydopamine Coating
Jacob Miszuk¹, Tao Xu¹, Yong Zhao¹, Hongli Sun¹, and Hao Fong²
¹University of South Dakota, Sioux Falls, SD, ²South Dakota School of Mines and Technology, Rapid City, SD

**Th-78**
Mechanical Response of the Tracheal System to Hemolymph Pressure in the Beetle Zophobas morio
Khaled Adjerid¹, Hodjat Pendar¹, and Jake Socha¹
¹Virginia Tech, Blacksburg, VA

**Th-79**
Development of Hyaluronan-Based Microrods for the Attenuation of Chronic Cardiac Fibrosis
Long Le¹, Michael Mkrtschjan², Brenda Russell¹, and Tejal Desai¹
¹University of California, San Francisco, San Francisco, CA, ²University of Illinois at Chicago, Chicago, IL

**Th-80**
A Mechanistic Evaluation of Intrinsic Crosslinking Properties and Synthesis Procedures for Keratin-based Microparticles
Marc Thompson¹ and Mark Van Dyke¹
¹Virginia Tech, Blacksburg, VA
**Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**

**Track: Biomechanics**

**Injury Biomechanics**

**Th-105**

Effect of Restraint Conditions and ATD Type on Thoracic and Femoral Responses in Frontal Sled Tests

Devon Albert¹, Stephanie Beeman¹, Craig McNally¹, and Andrew Kemper¹
¹Virginia Tech, Blacksburg, VA

**Th-106**

Using Numerical Simulation of Automotive Crashes to Predict Vertebral Loads And Influence Of Vehicle Parameters

Jeffrey Suhey¹, Derek Jones¹, James Gaewsky¹, Ashley Weaver¹, and Joel Stitzel¹
¹Virginia Tech-Wake Forest University, Winston-Salem, NC

**Th-107**

Development of Elderly Female Rib Finite Element Model

Keegan Yates¹ and Costin Untaroiu¹
¹Virginia Tech, Blacksburg, VA

**Th-108**

Blast Mitigation Performance of Floor Mat Material and Lower Limb Fracture Risk by a High Rate Impact Rig Simulating Anti-Vehicle Land Mine

Liying Zhang¹ and Paul Begeman¹
¹Wayne State University, Detroit, MI

**Th-109**

Upper and Lower Extremity Injuries in Low Speed Vehicle Collisions

Omid Komari¹, William Bliss¹, Nicholas Toosi¹, and Kevin Toosi¹
¹Pittsburgh Biomechanics, Pittsburgh, PA

**Th-110**

Mechanistic Differentiation Between Blunt Impact and Primary Blast in Causing Ocular Injury

Richard Watson¹ and Matthew Reilly¹
¹University of Texas San Antonio, Helotes, TX, ²The Ohio State University, Columbus, OH

**Track: Neural Engineering**

**Brain and Spinal Cord Injury**

**Th-115**

n-3 Long-Chain Polyunsaturated Fatty Acids Decrease in Pediatric Traumatic Brain Injury

Charlotte Mae Waits¹, Steven Kosmach², Susan Sergeant¹,
Floyd H. Chilton¹, Charles S. Cox², and Elaheh Rahbar¹
¹Wake Forest School of Medicine, Winston-Salem, NC,
²University of Texas Health Science Center at Houston, Houston, TX,
³Texas A&M University, College Station, TX

**Th-116**

Neuroprotection via Immobilized BDNF Fragment Peptides for Sustained Presentation Following TBI

Christopher Lowe¹ and David Shreiber¹
¹Rutgers University, Piscataway, NJ

**Th-117**

Interfacing a Central Pattern Generator Model with a Musculoskeletal Model

Lin Tong¹, Ismael Perez¹, Patrick Arguello¹, and Deborah Won¹
¹California State University, Los Angeles, Los Angeles, CA

**Track: Neural Engineering**

**Glial Cell Engineering: Promoting Regeneration and Addressing Degeneration**

**Th-118**

Rapid Screening of 3D Composite Biomaterials for Optimization of Glial and Neuronal Behavior

Christopher Bertucci¹, Isabella Kronau¹, Sriram Ramamoorthy¹,
Pankaj Karande¹, and Deanna Thompson¹
¹Rensselaer Polytechnic Institute, Troy, NY, ²Academy of the Holy Names Upper School, Troy, NY

**Th-119**

Electrical and Chemical Stimulation of Neural Cells for Retinal Integration

Shawn Mishra¹, Stephen Redenti², and Maribel Vazquez¹
¹City College of New York, New York, NY, ²Lehman College, Bronx, NY

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**Th-100**

Mechanical Testing of A Burlap-Epoxy Composite For Use In Prosthetics

Mary Arico¹ and Suhash Ghosh¹
¹University of Hartford, West Hartford, CT

**Th-101**

A Novel Total Knee Replacement That Incorporates Synthetic Ligaments to Influence Knee Stability

Michael Stokes¹, Luke Pietrykowski¹, Taylor Gambon¹, Brendan Greene¹, Caroline Bales¹, and John DesJardins¹
¹Clemson University, Clemson, SC

**Th-102**

Strains and Stresses in Trans-Femoral Prosthetic Socket

Sara Naftali¹, Dennis Dashevsky¹, and Anat Ratnovsky¹
¹Afeka–Tel Aviv Academic College of Engineering, Tel Aviv, Israel

**Th-103**

Strains and Stresses in Trans-Tibial Prosthetic Socket

Sara Naftali¹, Guy Ateret¹, and Anat Ratnovsky¹
¹Afeka–Tel Aviv Academic College of Engineering, Tel Aviv, Israel

**Th-104**

Experimental Thermal Analysis of a Novel Prosthetic Socket along with Silicon and PCM Liners

Sayed Cyrus Rezvanifar¹, Stephen Conklin¹, and Brian L. Davis¹
¹The University of Akron, Akron, OH

**Th-105**

Biomechanical Properties of Neonatal Brachial Plexus

Shania Shaji¹, Anita Singh¹, Holly Sinnott¹, Gabrielle Gehron¹,
Shadi Malaeb², and Maria Delivoria-Papadopoulos²
¹ Widener University, Chester, PA,
² Drexel University College of Medicine, Philadelphia, PA

**Th-112**

Semi-Automated Analysis of Driver Response in a Finite Element Crash Test Reconstruction

Xin Ye¹, James Gaewsky¹, Derek Jones¹, Bharath Koya¹, Tim Barnard¹, Ashley Weaver¹, Joel Stitzel¹, Jennifer N Турновец²
¹Wake Forest University School of Medicine, Winston-Salem, NC,
²Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC

**Th-113**

Impact of High Intensity Noise Exposure on Stapedius Muscle Function in Chinchillas

Zachary Yokell¹, Don Nakmali¹, and Rong Gan¹
¹University of Oklahoma, Norman, OK

**Th-114**

Finite Element Human Body Models for Industrial Applications

Zahra Asgharpour¹
¹Materialise N.V., Leuven, Belgium

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**Track: Neural Engineering**

**Glial Cell Engineering: Promoting Regeneration and Addressing Degeneration**

**Th-118**

Rapid Screening of 3D Composite Biomaterials for Optimization of Glial and Neuronal Behavior

Christopher Bertucci¹, Isabella Kronau¹, Sriram Ramamoorthy¹,
Pankaj Karande¹, and Deanna Thompson¹
¹Rensselaer Polytechnic Institute, Troy, NY, ²Academy of the Holy Names Upper School, Troy, NY

**Th-119**

Electrical and Chemical Stimulation of Neural Cells for Retinal Integration

Shawn Mishra¹, Stephen Redenti², and Maribel Vazquez¹
¹City College of New York, New York, NY, ²Lehman College, Bronx, NY
**Th-120**
Astrocyte Response to Viscoelastic Mechanical Properties in Three-dimensional Scaffolds
Amber Busher¹, Zachary DiMattia¹, Matthew Fiori¹, Jonathon Zachok¹, and Peter Galie¹
¹Rowan University, Glassboro, NJ

**Track: Neural Engineering**
Axonal Growth and Guidance

**Th-124**
Ultrasound-Enhanced Molecular Therapy for Axon Neurogenesis
Asis Lopez², Ashwin Sivakumar¹, Adrian Jones¹, Bridget K Daugherty¹, Michael Moore¹, Damir B. Khismatullin¹, and Asis Lopez¹
¹Tulane University, New Orleans, LA

**Th-125**
Topographical Cues for Human Embryonic Stem Cell-Derived Retinal Ganglion Cells Axonal Extension and Organization
Calvin Chang¹, Hai-Quan Mao¹, and Donald Zack¹
¹Johns Hopkins University School of Medicine, Baltimore, MD

**Th-126**
Vagus Nerve Stimulation Paired with Rehabilitation Improves Functional Recovery Following Peripheral Nerve Injury
Eric Meyers¹, Rafael Granja¹, Ruby Solorzano¹, Patrick Ganzer¹, Nicole Robertson¹, Katherine Adcock¹, Maria Romero-Ortega¹, Michael Kilgard¹, Robert Rennaker¹, and Seth Hays¹
¹University of Texas at Dallas, Richardson, TX

**Th-127**
An Injectable, Anisotropic Hydrogel for Directed Cell and Nerve Growth
Jonas Rose¹, María Cámara-Torres¹, Jens Koehler¹, Khosrow Rahimi¹, and Laura De Laporte¹
¹DWI-Leibniz-Institute for Interactive Materials, Aachen, Germany

**Track: Neural Engineering**
Neural Coding and Modeling

**Th-128**
Evolution of Brain Network Dynamics in Neurodevelopment
Lucy R. Cha¹, Ankit N. Khambhati¹, Ruben C. Gur¹, Raquel E. Gur¹, Theodore D. Satterthwaite¹, and Danielle S. Bassett¹
¹University of Pennsylvania, Philadelphia, PA

**Th-129**
Artifact Removal Using Advanced Moving Average Filter for Accurate Detection of Short-Latency Spikes
Sungjin Oh¹, Sungmin Han¹, Dong Hwee Kim¹, Heesu Park¹, and Inchan Youn¹
¹Korea Institute of Science and Technology, Seoul, Korea, Republic of
²Korea University College of Medicine, Seoul, Korea, Republic of
³Korea University of Science and Technology, Daejeon, Korea, Republic of

**Th-130**
Electrophysiologic Features of Recovery in Deep Brain Stimulation for Depression
Vineet Tiruvadi¹, Ashan Veerakumar¹, Andrea Crowell¹, Allison Waters², Robert Butera³, Patricio Riva-Posse³, and Helen Mayberg⁴
¹Georgia Institute of Technology, Atlanta, GA, ²Emory School of Medicine, Atlanta, GA, ³University of Maryland, College Park, MD

**Track: Neural Engineering**
Neural Interfaces: Closed-Loop Control

**Th-131**
Automated Localization Using Novel Feature Extraction and Clustering In Focal Epilepsy
Brent Berry¹
¹Mayo Clinic, Rochester, MN

**Th-132**
Towards a Closed-loop Deep Brain Stimulator for the Improved Treatment of Essential Tremor
Enrico Opri¹, Jonathan Shute¹, Rene Molina¹, Michael S. Okun¹, Kelly D. Foote¹, and Aysegul Gunduz¹
¹University of Florida, Gainesville, FL

**Th-133**
Closed-Loop Deep Brain Stimulation Using Wearable Sensors for the Improved Treatment of Essential Tremor
Jackson Cagle¹, Kenan Tufekci¹, Francy Perez¹, Neel Patel¹, Dylan Zuniga¹, Giang Nguyen¹, Enrico Opri¹, and Aysegul Gunduz¹
¹University of Florida, Gainesville, FL

**Th-134**
Creating a Localized and Dynamic Facial Somatotopic Map of Area 3b Using Cutaneous Vibratory Stimulation
Justin Tanner¹, Taylor Hearnt¹, and Stephen Helms Tillery¹
¹Arizona State University, Tempe, AZ

**Th-135**
Towards Responsive Deep Brain Stimulation For Medically Refractory Freezing Of Gait In Parkinson’s Disease
Rene Molina¹, Jonathan Shute¹, Enrico Opri¹, Peter Rossi¹, Kelly Foote¹, Michael Okun¹, and Aysegul Gunduz¹
¹University of Florida, Gainesville, FL

**Th-136**
Planar Control of a Quadcopter Using a Zero-Training Brain Machine Interface Platform
Reza Abiri¹, Justin Kilmarx¹, Mohammad Raj¹, and Xiaopeng Zhao¹
¹University of Tennessee, Knoxville, TN

**Track: Neural Engineering**
Neural Progenitor and Neural Stem Cell Engineering

**Th-137**
Boosting Effect of EGF on Development of Neural Network Activity
Daejeong Kim¹, Jeewoong Lee¹, and Yoonkey Nam¹
¹KAIST, Daejeon, Korea, Republic of

**Th-138**
In vitro Approaches for Directing the Differentiation of Adult Neural Stem Cells into Neurons
Lindsey Crawford¹ and Shelly Sakiyama-Elbert¹
¹Washington University in St. Louis, St. Louis, MO

**Th-139**
3D Printing Scaffold Containing Aligned Channels for Inducing Mesenchymal Stem Cell Neural Differentiation
Wei Zhu¹, Fahed Masood², and Lijie Grace Zhang¹
¹The George Washington University, Washington, DC, ²University of Maryland, College Park, MD
**Track: Neural Engineering Neurodegenerative Disease**

**Th-140**
Neuronal Protection against Oxidative Insult by Polyanhydride Nanoparticle-based Antioxidant Therapy
Timothy Brenza¹, Shivani Ghasaisa¹, Dilshan Harischandra¹, Julia Vela-Ramirez², Benjamin Schlichtmann³, Gary Zenitsky¹, Balaraman Kalyanaraman², Velledreddy Anantharam¹, Anumanta Kanthañasamy¹, and Balaji Narasimhan¹
¹Iowa State University, Ames, IA, ²Medical College of Wisconsin, Milwaukee, WI

**Th-141**
Optimally Selected Features Detect and Predict Freezing of Gait in Parkinson’s Disease
Sadra Hemmati¹ and Eric Wade¹
¹University of Tennessee, Knoxville, TN

**Th-142**
Biomaterials for Human Pluripotent Stem Cell Derived Midbrain Dopaminergic Neuron Generation and Transplantation to Treat Parkinson’s Disease
Maroof Adil² and David Schaffer¹
¹University of California Berkeley, Berkeley, CA

**Th-143**
Olive Oil Antioxidants Modulate Amyloid- Oligomer Toxicity Associated with Alzheimer’s Disease
S. Zeb Vance¹, Colman Moore¹, and Melissa Moss¹
¹University of South Carolina, Columbia, SC

**Th-144**
Effect of Tremor on Reaching Task Performance in Patients with Parkinson’s Disease
Zixiang Hu¹, Manzhao Hao¹, Shaoting Xu², Fuliang Xu¹, Qiu Xiaö, and Ning Lan¹,²,4
¹Med-X Research Institute, Shanghai, China, People’s Republic of, ²Department of Neurology and Institute of Neurology, Ruijin Hospital affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, People’s Republic of, ³Division of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, CA, ⁴University of Southern California, Los Angeles, CA

**Tracks: Biomechanics, Neural Engineering TBI and Conussion Biomechanics**

**Th-145**
An “Intelligent Mouthguard” Meets the NFL Level I Head Impact Dosimeter Validity Specification
Adam Bartsch¹ and Sergey Samorezov¹
¹Cleveland Clinic, Cleveland, OH

**Th-146**
Biomechanical Performance of Hockey Helmets
Bethany Rowson¹, Abigail Tyson¹, Bryan Cobb¹, Steven Rowson¹, and Stefan Duma¹
¹Virginia Tech, Blacksburg, VA

**Th-147**
Strain-based Validation of an Instrumented Mouthguard
Calvin Kuo¹, Michael Fenton¹, Lyndia Wu¹, Jason Luck², Hattie Cutcliffe¹, Robert Lynall², Kody Campbell², Jason Mihalik³, Cameron Bass², and David Camarillo¹
¹Stanford University, Stanford, CA, ²Duke University, Durham, NC, ³University of North Carolina, Chapel Hill, Chapel Hill, NC

**Th-148**
Relating On-Field Head Impacts to Standards Testing: Comparison of Youth and Adult Football Helmets
David Sproule¹, Eamon Campolettano¹, and Steven Rowson¹
¹Virginia Tech, Blacksburg, VA

**Th-149**
Drill-Specific Head Impact Exposure in Youth Football Practice
Eamon Campolettano¹, Steven Rowson¹, and Stefan Duma¹
¹Virginia Tech, Blacksburg, VA

**Th-150**
Multi-objective Design Optimization of a Football Helmet Facemask
Kyle Johnson¹, Souma Chowdhury¹, William Lawrimore¹, Yuxiong Mao¹, Ali Mehrmani¹, Alston Rush¹,², and Mark Horstemeyer¹,²
¹Mississippi State University, Starkville, MS, ²Center for Advanced Vehicular Systems, Starkville, MS, ³University of Buffalo, Buffalo, NY, ⁴U.S. Army Engineer Research and Development Center, Vicksburg, MS, ⁵Predictive Design Technologies, Starkville, MS, ⁶Columbia University, New York, NY

**Th-151**
Differences in The Ability of Bicycle Helmets to Reduce Risk Of Head Injury
Megan Bland¹ and Steven Rowson¹
¹Virginia Tech, Blacksburg, VA

**Th-152**
Performance Evaluation of Injury Predictors and Identification of Most Vulnerable Deep White Matter Regions
Wei Zhao¹, Zhigang Li¹, and Songbai Ji¹
¹Dartmouth College, Hanover, NH

**Th-153**
Kinematic Sensitivities On Brain Strain Via a Pre-computed Atlas
Wei Zhao¹ and Songbai Ji¹
¹Dartmouth College, Hanover, NH

**Th-154**
Significance of Rotational Velocity Impulse Shape On Brain Strains
Wei Zhao¹ and Songbai Ji¹
¹Dartmouth College, Hanover, NH

**Th-155**
Characterization of Cumulative Subconcussive Exposures of Blunt and Blast Injury
Mathew Long¹,², Aswati Aravind¹,², Namas Chandra¹, Viji Santhakumar¹, Kevin Pang¹,², and Bryan Pfister¹
¹New Jersey Institute of Technology, Newark, NJ, ²New Jersey Medical School, Newark, NJ

**Th-156**
Hyperconnectivity of Event-Related Potential Networks Enhanced By Mild Brain Injury & Anesthesia
Lorre Atlani and Susan Margulies¹
¹University of Pennsylvania, Philadelphia, PA

**Th-157**
Modulation of Calcium Dynamics in Astrocytes in Spatially Confined Microcavitation Zone
Bo Chen¹, Johnwesly Kanagaraj¹, and Michael Cho¹
¹University of Texas at Arlington, Arlington, TX, ²University of Illinois at Chicago, Chicago, IL

**Th-158**
Development of Micropatterned Cell Culture Models to Elucidate the Effect of Collapsing Microcavitation
Jessica Tjahja¹, Sameep Malla¹, Christopher Elias¹, Bo Chen¹, and Michael Cho¹
¹University of Texas at Arlington, Arlington, TX
Th-159
Adjusting Powered-Knee Prosthesis Impedance Parameters Improves Gait Symmetry During Load Carriage
Andrea Brandt¹, Ming Liu¹, and He (Helen) Huang¹
¹NC State University/UNC Chapel Hill, Raleigh, NC

Th-160
Step Length and Width Changes during Pseudorandom Perturbations during Walking in Young Adults
Jacob Van Dehy¹, Tanya Onushko¹, Timothy Boerger¹, and Brian Schmit¹
¹Marquette University, Milwaukee, WI

Th-161
A Wrist and Hand Exoskeleton Orthosis Controlled by EMG Sensors
Edward F. Austin¹, Pedro J. Chacon¹, Young-Ho Shin¹, Mitchell A. St. Pierre¹, and Jin-Woo Choi¹
¹Louisiana State University, Baton Rouge, LA

Th-162
Computer-Controlled Lower Limb Exoskeleton Ambulation System for Paraplegia
Yang Zhou¹, Chaoyan Chen¹, Yousef Alshahrani¹, Pan Tian¹, Jie Hu², Mark Ming-Cheng Cheng¹, and John Cavanaugh¹
¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of China

Th-163
Development of Step Counting Algorithm from the Ambulatory Tibial Load Analysis System
Arad Lajevardi-Khosh¹, Ben Tesco¹, Ami Stuart¹, Tomasz Petelenz¹, and Robert Hitchcock¹
¹University of Utah, Salt Lake City, UT

Th-164
Wireless, Passive Magnetoelastic Sensor for Monitoring Stress At Orthopedic Implants
Govindan Suresh¹, Keat Ong¹, and Andrew Derouin¹
¹Michigan Technological University, Houghton, MI

Th-165
NPWT Effects Wound Healing Cues in Tissues Surrounding Percutaneous Devices
Saranne Mitchell¹, Sujeet Jayapolalina¹,², Robert Bowles¹, and Kent Bachus¹,²
¹University of Utah, Salt Lake City, UT, ²Department of Veterans Affairs, Salt Lake City, UT

Th-166
Effect of Collegiate Swim Training on Rotator Cuff Properties, Shoulder Strength, and Subjective Outcomes
Jack Dischler¹, Timothy Baumer¹, and Michael Bey¹
¹Henry Ford Hospital, Detroit, MI

Th-167
Creep Loading of Tendons Causes Extensive and Severe Fibril and Molecular-Level Damage
Khaled Hijazi¹, Kathy Singfield¹, and Samuel Veres¹,²
¹Saint Mary’s University, Halifax, NS, Canada, ²Dalhousie University, Halifax, Canada

Th-168
Rotator Cuff Grafts using Decellularized Porcine MSC Seeded Tendons Cultured in a Mechanical Stimulator
Chelsea E. Coffey¹, Younji Sohn¹, and Vassilios Sikavitsas¹
¹University of Oklahoma, Norman, OK

Th-169
Thoracic Volume 3D Computational Modeling of Virtual Scheuermann’s Kyphosis with Wedging Fractures
Po-Chih Lee¹, Arthur Erdman¹, Charles Ledonio¹, and David Polly¹
¹University of Minnesota, Minneapolis, MN

Th-170
Augmentation of Energy Production of the Intervertebral Disc with Polyurethane Mass Transfer Device
Yu-Fu Wang¹ and Chun-Yuh Charles Huang¹
¹Department of Biomedical Engineering, University of Miami, Coral Gables, FL

Th-171
The Cell Response of 7F2 Osteoblasts to Low-Dose Radiation
Katelyn Truong¹, Suzanne Bradley¹, Matthew Rusin¹, Endre Takacs¹, and Delphine Dean¹
¹Clemson University, Clemson, SC
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Th-174**
Evaluation of Equestrian Helmet Energy Attenuation Performance
Anne Hoch¹, Linda McGrady¹,², Amy Ford¹, and Mei Wang¹,²
¹Medical College of Wisconsin, Milwaukee, WI, ²Marquette University, Milwaukee, WI

**Th-175**
Self Contained Bioreactor for Bone Regeneration
Pratima Labroo¹, Ching-wen Li², Himanshu Sant¹, Bruce Gale¹, Jill Shea¹, and Jay Agarwal¹
¹University of Utah, Salt Lake city, UT, ²National Ching Hsing University, Taipei, Taiwan

**Th-176**
GaitAssist: A Novel Technology to Mitigate Scissoring Gait in Patients with CP
Yu Xu¹, Jacob Schick¹, Kaijuan Wang¹, Kevin Xin¹, Andie Seabrooke¹, Michael Ruiz¹, Michael Ruiz¹, Ana Ainechi¹, Alexander de la Vega¹, Alexander Hoon¹, Brittany DeCres⁴, Tara Johnson², and Robert Allen¹
¹Johns Hopkins University, Baltimore, MD, ²Kennedy Krieger Institute, Baltimore, MD

**Track: Biomedical Engineering Education (BME)**

**Ethics**

**Th-177**
Ethical Challenges in Biomedical Engineering Education And Research
Subrata Saha¹ and Pamela Saha¹
¹SUNY Downstate Medical Center, Brooklyn, NY

**Track: Biomedical Engineering Education (BME)**

**Curriculum Content**

**Th-178**
A Course in "Maker Activities" for a Master of Engineering Design and Commercialization
Brandon Kirkland¹, Ophelia Johnson¹, and Alan Eberhardt¹
¹University of Alabama at Birmingham, Birmingham, AL

**Th-179**
An Innovative and Collaborative Method for Introducing Industry Standards into Biomedical Engineering Curriculum at the University of Toronto
Andrey Shukalyuk¹ and Dawn Kilkenny¹
¹University of Toronto, Toronto, ON, Canada

**Th-180**
Performance of Students on Scholarships in the Biomedical Engineering Program at Universidad de los Andes
Diana Gaitan¹ and Juan Carlos Briceno³
¹U de los Andes, Bogota, Colombia

**Th-181**
Molecules and Cells: Using Multiple Teaching Methods Promotes Long Term Retention
Eileen Haase¹ and Harry Goldberg¹
¹Johns Hopkins University, Baltimore, MD

**Th-182**
Developing Communication Skills in Biomedical Engineering Undergraduate Students through a Cross-Disciplinary Service Project
Jennifer Keshwa¹ and Krista Adams¹
¹University of Nebraska Lincoln, Lincoln, NE

**Th-183**
Moving from a Scientific Undergraduate Thesis Project to a Capstone Design Project: Challenges and Possibilities
Maria Fernanda Olarte-Sierra¹ and Juan Briceño¹
¹Universidad de los Andes, Bogota, Colombia

**Track: Biomedical Engineering Education (BME)**

**Design**

**Th-184**
Designing Hands On Bioengineering Graduate Curriculum for Diverse Audiences
Adele Doyle¹
¹University of California Santa Barbara, Santa Barbara, CA

**Th-185**
The The Teaching Dead: Season III-2 Years Post Infection
Jeffrey La Belle¹, Stephanie Maxwell¹, Aldin Malkoc¹, Joseph Heath¹, and Kara Karaniuk¹
¹Arizona State University, Tempe, AZ

**Th-186**
The History of The BME-IDEA Meeting and Report-out for 2016
Joe Tranquillo¹ and Youseph Yazdi²
¹Bucknell University, Lewisburg, PA, ²Johns Hopkins University, Baltimore, MD

**Th-187**
Design of a Laminar Flow Hood for a Pediatric Hospital in Vietnam
Miiri Kotsche¹, Barak Stoltz¹, Tejas Madhavan¹, Josh Shubert¹, Beny Rono¹, and Fatima Rizvi¹
¹University of Illinois at Chicago, Chicago, IL

**Track: Biomedical Engineering Education (BME)**

**Entrepreneurship and Innovation**

**Th-188**
A Master of Engineering in Design and Commercialization
Alan Eberhardt¹ and Lee Moradi¹
¹University of Alabama at Birmingham, Birmingham, AL

**Th-189**
Using STEM to STEAM Initiatives to Create Multi-disciplinary Engineering Teams
Lola Brown¹ and Gilda Barabino¹
¹City College of New York, New York, NY

**Th-190**
Use of Needs Assessment to Improve "Empathize" Step In Design Thinking for Freshmen Bioengineers
Ruth Ochia¹
¹Temple University, Philadelphia, PA

**Th-191**
Executing a Business Start-Up Model to Revamp Biomedical Engineering Training Tools
Sarah Rowlinson¹, Timothy Burg³, and Karen Burg¹²
¹Clemson University, Clemson, SC, ²University of Georgia, Athens, GA

**Th-192**
Encouraging Curiosity, Connections, and the Creation of Value in a Materials/Biomaterials Sequence: Part II Biomaterials
Silviya Zustiak¹ and Gary Bledsoe¹
¹Saint Louis University, St Louis, MO
Track: Biomedical Engineering Education (BME)

**Th-193**  
Student-Graded Homework Using Compare/Contrast and Self-Explanation Exercises  
Michael Caplan¹ and Nathan Kirkpatrick¹  
¹Arizona State University, Tempe, AZ

**Th-194**  
Osteocytes Density Reduction in Cortical Bone by Estrogen Deficiency and Functional Disuse and Countermeasure  
Dongye Zhang¹, Nancy Rojas², Yi-Xian Qin¹, and Minyi Hu²  
¹Stony Brook University, Stony Brook, NY, ²Stony Brook University, Brooklyn, NY

**Th-195**  
The Development of a Student-led Co-curriculum in Global Health Design: M-HEAL  
Kevin Jiang¹, Jennifer Lee¹, and Mary Munsell¹  
¹University of Michigan, Ann Arbor, MI

**Th-196**  
Chemical and Biomedical Engineering Educational MATLAB App for PK/PD Modeling of ACE-Inhibition  
Grace Harrell¹, Alexandra McPeak¹, and Ashlee Ford Versypt¹  
¹Oklahoma State University, Stillwater, OK

**Th-197**  
A K-12 Engineering Education Module: Hands-On Approach to Helmet Design  
Abigail Tyson¹, Bethany Rowson¹, and Steven Rowson¹  
¹Virginia Tech, Blacksburg, VA

**Th-198**  
Inquiry-Based Laboratories for Medical Electronics Course  
Jean-Michel Maarek¹  
¹University of Southern California, Los Angeles, CA

**Th-199**  
Updating Biomechanics Materials Laboratory Class: Innovations in Student Reports  
Michael Nowak¹  
¹University of Hartford, West Hartford, CT

**Th-200**  
Tissue Engineering Scaffold Design for Sophomore Biomedical Engineering Students  
Nicolas Mann¹, Daniel Infusino², Matthew Goldner², and Vince Beachley²  
¹Rowan University, Glassbo, NJ, ²Rowan University, Glassboro, NJ

**Th-201**  
Integrating Biological Design-Thinking and The Scientific Method into Undergraduate Biomedical Engineering Curriculum  
Ritu Raman¹, Marlon Mitchell¹, Pablo Perez-Pinera¹, Rashid Bashir¹, and Lizzanne DeStefano²  
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Georgia Institute of Technology, Atlanta, GA

**Th-202**  
Functional Electrical Stimulation Laboratory for Introductory Courses in Biomedical Engineering  
Seung-Jae Kim¹  
¹California Baptist University, Riverside, CA

**Th-203**  
Development of an Online Multistep Engineering Problem Solving Course Using LabVIEW  
Samual Lines¹, Mehdi Shokoueinejad², and Amit Nimunkar³  
¹University of Wisconsin-Madison, Madison, WI, ²University of Wisconsin-Madison, Madison, WI, ³University of Wisconsin-Madison, Madison, WI

**Th-204**  
Development of a Patient-Focused Biomedical Engineering Program within a Small Liberal Arts University  
Brian Plouffe¹  
¹Regis College, Weston, MA

**Th-205**  
A "Boot Camp" As In-laboratory Introduction to Research Methods for a Research Experiences for Undergraduates Program  
Margo Cousins¹, Stephanie Young¹, Erin Dolan¹, Lynda Gonzales¹, Brandi DeMont¹, Mia Markey¹, and Laura Suggs¹  
¹University of Texas at Austin, Austin, TX

**Th-206**  
VHA/NCI Big Data Scientist Training Enhancement Program: New Opportunities & Outcomes  
Connie Lee¹, Sean Hanlon², and Michelle Berry-Lang²  
¹Employee Education System, Veterans Health Administration, U.S. Department of Veterans Affairs, Washington, DC, ²Center for Strategic Scientific Initiatives, Office of the Director, National Cancer Institute, National Institutes of Health, Bethesda, MD

**Th-207**  
Image Processing Tools for Contact Angle Assessment to Evaluate Wettability of Dental Materials  
Rana Abdelsalam¹, Teresa Ryan¹, and Waldem De Rijk¹  
¹East Carolina University, Greenville, NC
Track: Biomedical Imaging and Optics

**Image Assisted Biological Modeling**

*Th-208*

An Automated Real-time Approach for Quantifying Phagocytosis and Reactive Oxygen Species Levels

Andre Paredes¹ and Jun Cheng¹

¹University of Illinois at Chicago, Chicago, IL

*Th-209*

Utilizing Noninvasive Imaging Techniques to Classify Radiation Response in a Pediatric Brain Tumor Model

Τien Tang², Janice Zawaski², Kathleen Francis¹, Amina Qutub², and M. Waleed Gaber¹

¹Rice University, Houston, TX, ²Baylor College of Medicine, Houston, TX

*Th-210*

Comparative Study of In Vivo Degradation Tracking and Modeling using Auto-fluorescent Protein Microspheres and Nanoparticles Suspension

Xiaoyu Ma¹, Jun Chen¹, Tai-Hsi Fan¹, and Yu Lei¹

¹University of Connecticut, Storrs, CT

**Th-211**

Laser Interstitial Thermal Therapy for Minimally Invasive Ablation of Small Renal Tumors

Luis Fontaneda³, Nelson Salas³, and Karli Pease³

³University of Miami, Coral Gables, FL

**Th-212**

Paired-agent Fluorescence Imaging Improves Contrast of Cranial Nerves

Veronica Torres¹, Joshua Wewel², Richard Byrne², and Kenneth Tichauer¹

¹Illinois Institute of Technology, Chicago, IL, ²Rush University Medical Center, Chicago, IL

**Th-213**

Dual-modality Smartphone Fiber-optic Endoscope for Early Detection of Cervical Cancer in Low-Resource Settings

Xiangqian Hong¹ and Bing Yu¹

¹The University of Akron, Akron, OH

**Track: Biomedical Imaging and Optics**

**Image Guided Therapy and Surgery**

*Th-214*

Automated Segmentation of Prostate Tissue for Partial Wave Spectroscopy (PWS) Analysis using Non-rigid Registration and k-means Clustering Method

Qin Miao¹, Saurabh Bagalkar², Justin Derbas², Harihar Subramanian³, and Vadim Backman¹

¹Northwestern University, Evanston, IL, ²Nanocytomics LLC, Evanston, IL

**Track: Biomedical Imaging and Optics**

**Imaging Informatics**

*Th-215*

Characterization of Pulmonary Fibrosis on HRCT Images Using Deep Learning

Xavier Gonzalez³, Diego Llarrull⁴, Mirabela Rusu³, and Anasf Salleb-Aouissi¹

¹Columbia University, New York City, NY, ²University of Buenos Aires, School of Engineering, Ciudad de Buenos Aires, Argentina, ³General Electric, Niskayuna, NY

*Th-216*

An Automated Method for Low Resolution Optical Character Recognition on Pulse Volume Recording Image

Zhexuan Zhang¹, Uygar Teomete¹, and Weizhao Zhao¹

¹University of Miami, Coral Gables, FL

**Track: Biomedical Imaging and Optics**

**Imaging Techniques in Neuroscience**

*Th-217*

Cerebral Blood Flow is Linked to EEG Bursting after Cardiac Arrest and Resuscitation

Christian Crouzet¹, Robert H. Wilson¹, Maryam H. Farahabadi¹, Afshaneh Bazrafkan¹, Donald Lee¹, Juan Alcocer¹, Bruce J. Tromberg¹, Yama Akbari¹, and Bernard Choi¹

¹UC Irvine, Irvine, CA

*Th-218*

Multicolor Scanning Plane Illumination Microscope for Imaging Embryonic Brain Development in Zebrafish

Nathan Hart¹, Holly Gibbs¹, Arne Lekven¹, and Alvin Yeh¹

¹Texas A&M University, College Station, TX

**Track: Biomedical Imaging and Optics**

**Molecular Imaging**

*Th-225*

Multimodal Photoacoustic Lifetime and Ultrasound Imaging System

Ekaterina Ippolito¹ and Shai Ashkenazi¹

¹University of Minnesota, Minneapolis, MN
### Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**

**Th-226**

**Ultra-Sensitive Detection of Circulating miRNA with Quantum Dots**

Lucas Smith¹, Yang Liu¹, and Andrew Smith¹

¹University of Illinois, Urbana, IL

**Th-227**

**Enhancing Reactivity of Antibody-Conjugated trans Cyclooctenes for Bioorthogonal Pretargeting**

Maha Rahim², Rajesh Kota³, Ting-yi Chu¹, and Jereed Haun¹

¹University of California Irvine, Irvine, CA

**Th-228**

**Devising Novel Eu(III)-based pH-responsive Bio-probes for Selective Lysosome Imaging**

Sergey Shuvaev³, Robert Pal², Mark Fox¹, and David Parker¹

¹Durham University, Durham, United Kingdom

**Th-229**

**Staining Paired-Agent Model (SPAM) For Cell Surface Receptor Concentration Estimation in Thick Tissue Imaging**

Xiaochun Xu¹, Yu Wang³, Jonathan T.C. Liu², Jialing Xiang³, and Kenneth M. Tichauer¹

¹Illinois Institute of Technology, Chicago, IL, ²University of Washington, Seattle, WA

**Th-230**

**Experimental Investigation of the Impact of Excitation Beam on Chemical Concentration Sensitivity for X-Ray Fluorescence Computed Tomography (XFCT)**

Xu Dong¹ and Guohua Cao¹

¹Virginia Tech, Blacksburg, VA

**Th-231**

**Peptide Beacons for Protein Imaging in Live Cells**

Zhenjiang Zhang¹, Ciaran Lee¹, Anirban Ray¹, Sheng Tong¹, and Gang Bao¹

¹Rice University, Houston, TX

**Track: Biomedical Imaging and Optics Molecular Probes**

**Th-232**

**PEI-Coated Rare Earth Doped Nanoparticles as Dual-Modality Contrast Agent for Shortwave Infrared And Photoacoustic Imaging**

Mei Chee Tan¹, Shuqing He¹, Nitish Thakor³, and Lun-De Liao²

¹Singapore University of Technology and Design, Singapore, Singapore, ²National University of Singapore, Singapore, Singapore

**Th-233**

**Reporter+Probe Biosensors: Toehold-Mediated Strand Displacement for Detection of MiR-29b-1-5p**

Nicholas E. Larkey¹, Corinne N. Brucks¹, Natasha M. Smith¹, and Sean M. Burrows¹

¹Oregon State University, Corvallis, OR

**Th-234**

**Carbon Nanodot as Biocompatible Probe for in Vivo Imaging**

Pantrika Krisanarungson Krisanarungson¹, Gregory Lecroy¹, Fan Yang¹, Yaping Sun¹, and Bruce Gao¹

¹Clemson University, Clemson, SC

**Track: Biomedical Imaging and Optics MRI**

**Th-235**

**Center Frequency Determination using Off-resonance Saturation in MRI**

Eamon Doyle¹,², Jonathan Chia², and John Wood¹,²

¹University of Southern California, Los Angeles, CA, ²Children's Hospital of Los Angeles, Los Angeles, CA, ³Philips Healthcare, Cleveland, OH

**Th-236**

**Development of a Custom TH/31P Spectroscopy Coil for Canine Models of Muscular Dystrophy**

Jeremy Sia¹, Kurt Purizek¹, Matthew Wilcox¹, and Mary McDougall¹

¹Texas A&M University, College Station, TX

**Th-237**

**Semi-automatic Image Processing of Craniospinal Morphometrics for Chiari Malformation**

Maggie Eppelheimer¹, Aintzane Urbizu³,², James Houston¹, Soroush Heidari Pahlavian¹, Audrey Braun³, Dipankar Biswas⁴, Philip Allen¹, Rick Labuda²,³, and Francis Lotč³

¹University of Akron, Akron, OH, ²Duke University, Durham, NC, ³Conquer Chiari, Wexford, PA

**Th-238**

**Brain White Matter Matter Orientation Dispersion Changes Associated with Subconcussive Head Impact Exposure After A Single Season Of Youth Football**

Naeim Bahrami¹, Elizabeth Davenport², Jillian Urban¹, Youngkkyo Jung¹, Joel Stitzel¹, Joseph Maldjian⁴, and Christopher Whitlow²

¹Wake Forest University, Winston Salem, NC, ²University of Texas South Western, Dallas, TX

**Th-239**

**Characterization of Structural Connectivity in Neural Ganglia: A Graph Theory Approach**

Abdul Aziz Ould Ismail², Ghoncheh Amouzande⁴,², and Samuel Grant²,²

¹Florida State University, Tallahassee, FL, ²National High Magnetic Field Laboratory, Tallahassee, FL

**Th-240**

**Electrical Conductivity Mapping at 21.1 T**

Ghoncheh Amouzande²,² and Samuel Grant²,²

¹Florida State University, Tallahassee, FL, ²National High Magnetic Field Laboratory, Tallahassee, FL

**Track: Biomedical Imaging and Optics Ultrasound Imaging**

**Th-241**

**Circle of Willis Model for Transcranial Doppler Ultrasound Training**

Conner Beyersdorf¹, Benjamin Hage¹, Edward Truemper¹,², and Greg Bashford¹,²

¹University of Nebraska, Lincoln, NE, ²Children’s Hospital & Medical Center, Omaha, NE

**Th-242**

**Novel Transcranial Doppler Headband for Simultaneous Measurement of Middle Cerebral and Basilar Artery Hemodynamics**

Marissa Nitz¹, Mohammed Alwatban¹, Benjamin Hage¹, Max Tweed¹,‡, Jessie Patterson¹, Julie Honaker¹, Edward Truemper¹,², and Greg Bashford¹,²

¹University of Nebraska, Lincoln, NE, ²Children’s Hospital & Medical Center, Omaha, NE

**Th-243**

**Use of Shear Wave Ultrasound Vibrometry for Detection of Simulated Esophageal Malignancy in ex vivo Porcine Esophagi**

Johnathon Aho¹, Ivan Nenadic¹, Sara Aristizabal Taborda¹,‡, Dennis Wigle¹, Daniel Tschumperlin¹, and Matthew Urban¹

¹Mayo Clinic, Rochester, MN

**Th-244**

**Classification of Breast Tumor Using Texture Analysis**

Viksit Kumar¹, Max Menis¹, Adrianne Gregory¹, Zeynnettin Akkus¹, Mahdi Bayat¹, Mustafa Fatemi¹, and Azra Alizada¹

¹Mayo College of Medicine, Rochester, MN
**Track: Cancer Technologies**

**Computational Modeling of Cancer Growth and Treatment**

**Th-246**
Optimizing Tumor Contrast During Surgery: Ideal Imaging Agent Parameters for Paired-agent Methods.
Aakanksha Rangnekar¹, Kimberley Samkoe², and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²Dartmouth College, Hanover, NH

**Th-247**
A Stochastic Model for Predicting Path Persistence of Cell Migration in a 3D Polymer Matrix
Benjamin Yeoman¹ and Parag Katira¹
¹San Diego State University, San Diego, CA

**Th-248**
Characterization of the Electrical Properties of Surgically Resected Human Healthy and Malignant Pancreatic Tissue in Response to Irreversible Electroporation for Treatment of Pancreatic Cancer
Suyashree Bhonsle¹, Andrea Rolong¹, Ahmad Safaai-Jazi¹, Clancy Clark², and Rafael Dalavals³
¹Virginia Tech, Blacksburg, VA, ²Wake Forest Baptist Medical Center, Blacksburg, VA

**Track: Biomechanics, Cancer Technologies, Cancer Mechanobiology**

**Th-249**
Inhibition of Endothelial Nitric Oxide Synthase Decreases Breast Cancer Cell MDA-MB-231 Adhesion to Intact Microvessels Under Physiological Flows
Lin Zhang¹, Min Zeng¹, and Bingmei Fu¹
¹The City College of the City University of New York, New York, NY

**Th-250**
Forces Generated by Single Cells During Three-Dimensional Growth
Jianyong Huang¹, Liangli Wang¹, and Fan Yuan¹
¹Duke University, Durham, NC

**Th-251**
The Effect of Cancer Cell Secreted Factors on Local and Global ECM Remodeling by Fibroblasts and Force-mediated YAP Nuclear Localization
Kyunghwa Choi¹ and Taher Saif¹
¹University of Illinois at Urbana Champaign, Urbana, IL

**Th-252**
Loading-Induced Interstitial Fluid Flow Was More Heterogeneous Than Matrix Strains in a 3D Bone Metastasis Model
Boyuan Liu¹, Gary Chang¹, Gabriel Kornilowicz¹, Suyue Han¹, Yahya Modarres-Sadeghi¹, and Maureen Lynch¹
¹UMass-Amherst, Amherst, MA

**Th-253**
Viscoelastic Correction of Stiffness-Dependent Growth Rates of Cancerous Human Breast Cells
Olaoluwa Adeniba¹, Elise Corbin¹,², and Rashid Bashir¹
¹University of Illinois, Urbana Champaign, Urbana, IL, ²University of Pennsylvania, Philadelphia, PA

**Th-254**
Fluid Shear Stress Activates Epithelial-To-Mesenchymal Transition Genes in Luminal Breast Cancer Subtype
Ursula Triantafillu¹, Nikki Klaassen², Andrew Raddatz¹, and Yonghyun Kim¹
¹University of Alabama, Tuscaloosa, AL, ²Kansas State University, Manhattan, KS

**Th-255**
Influence of Myoferlin on Cell Motility and Epithelial to Mesenchymal Transition in Erlotinib Resistant Lung Cancer Cells
Yin Cho¹, Vasudha Shukla², Douglas Kniss³,⁴, and Samir Ghadiali¹,⁴
¹The Ohio State University, Columbus, OH, ²The Wexner Medical Center at The Ohio State University, Columbus, OH

**Track: Cancer Technologies**

**Engineered Models of Cancer and the Tumor Microenvironment**

**Th-256**
Substrate Stiffness Regulates Drug-induced Cancer Cell Dormancy
Alisy Anlas¹ and Celeste Nelson¹
¹Princeton University, Princeton, NJ

**Th-257**
Development of Lymph Node Construct for Investigating Prostate Cancer Metastasis
Amirhossein Hakamivala¹, Carlos Chicas¹, Jose Castro¹, Charis Wallace¹, Ashwin Nair¹, and Liping Tang¹
¹University of Texas at Arlington, Arlington, TX

**Th-258**
Microfluidic Device for Modeling the Invasive Tumor Microenvironment in Colon Carcinoma Three Dimensional Tumor Models
Eric Weaver¹,², Amanda Hummon¹, and Pinar Zorlutuna³
¹University of Notre Dame, Notre Dame, IN, ²Harper Cancer Research Institute, Notre Dame, IN

**Th-259**
Rotational Collagen Alignment Using Acupuncture Needles Reveals Diversity in Contact Guidance
Jacob Nuhn¹, Juan Wang¹, and Ian Schneider¹
¹Iowa State University, Ames, IA

**Th-260**
3D Hydrogel-Based Microwell Arrays as a Tumor Microenvironment Model to Study Breast Cancer Growth
John Casey¹, Xiaoshan Yue¹, Trung Dung Nguyen¹, Victoria Zellmer¹, Siyuan Zhang¹, and Pinar Zorlutuna³
¹University of Notre Dame, Notre Dame, IN

**Th-261**
A Novel Vascularized Three-Dimensional Tissue-Engineered Model for Breast Cancer Metastasis
Julia Jin¹, Rachel Akintayo¹, Ross Weinreb¹, Kerry Morrison¹, Xue Dong¹, Omer Kaymakcalan¹, Andrew Abadeer¹, Sarah Karinja¹, and Jason Spector²
¹Weill Cornell Medical College, New York, NY

**Th-262**
Multiple Organ-on-a-Chip Platform for Metastasis Dynamic Studies
Julio Aleman¹,² and Aleksandr Skarda³,⁴, ⁵
¹Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, ²Wake Forest School of Medicine, Winston Salem, NC, ³Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston Salem, NC, ⁴Comprehensive Cancer Center of Wake Forest University School of Medicine, Winston Salem, NC
Th-263  Implantable Bioengineered Microenvironments to Study Human Tumor-Immune Interaction
Ryan Carpenter¹ and Jungwoo Lee¹,²,³  
¹University of Massachusetts Amherst, Amherst, MA, ²Department of Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA

Th-264  High-throughput Biomimetic 3D Models of Cancer Dormancy and Reactivation
Taraka Sai Pavan Grandhi¹, Thrimoorthy Potta¹, Indrani Deshpande¹, and Kaushal Rege¹  
¹Arizona State University, Tempe, AZ

Th-265  Hydrogel-based In Vitro Glioblastoma Spheroid Models
Lindsay Hill¹, Anisa Ashraf¹, and Silviya Zastik¹  
¹Saint Louis University, St. Louis, MO

Th-266  A 3-D Submucosal Microenvironment for Investigation of Fibroblast-Dependent Inflammation in Colorectal Cancer Cells
Mahesh Devarasetty¹,², Aleksander Skardal¹,², and Shay Soker¹,²  
¹Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ²Arizona Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC

Th-267  Flow Response of Myeloid Derived Suppressor Cells in the Breast Tumor Microenvironment
Matthew Perez¹, Janet Cross¹, and Jennifer Munson¹  
¹University of Virginia, Charlottesville, VA

Th-268  Three Dimensional (3D) High Density Tumor Microarray to Study the Influence of Stromal Cells on Cancer Invasion
Haripinder Saini¹, Karine Jocelyn Rosas Gomaz², Kiarash Rahmani², Robert Ros², and Mehdi Nikkhah²  
¹Arizona State University, Tempe, AZ, ²Arizona State University, Tempe, AZ

Th-269  High Throughput Oncology Drug Screening and Molecular Analysis Using Microtumored Tumor Spheroids
Pradip Shahi Thakuri¹, Stephanie Ham¹, Gary Luker², and Hossein Tavana¹  
¹University of Akron, Akron, OH, ²University of Michigan, Ann Arbor, MI

Th-270  Bioinspired DNA-Histone Complex to Study Metastasis-Promoting Activity of Neutrophil Extracellular Traps
Priyan Weerappuli¹,², Cameron Louttit¹, Taisuke Kojima¹, Midori Maeda¹, Cameron Yamanishi¹, Christopher Oliver¹, James Moon¹, and Shuichi Takayama¹  
¹University of Michigan, Ann Arbor, MI, ²University of Massachusetts, Amherst, MA

Th-271  Dissecting the Role of Bone Marrow-Derived Progenitor Cells in Pancreas Cancer
Rachel Edwards¹, David Prince², Taylor Heim¹, Mitchell Erickson¹, Marjorie Carlson¹, and Paolo Provenzano³  
¹University of Minnesota, Minneapolis, MN

Th-272  Comparative Analysis of Tumor Spheroid Generation Techniques for Differential In Vitro Drug Toxicity
Shreya Raghavan¹, Pooja Mehta¹, Eric Horst¹, Maria Ward¹, Katelyn Rowley¹, and Geeta Mehta¹  
¹University of Michigan, Ann Arbor, MI

Th-273  Title: Characterization of Growth Factor Stimulated MDA-MB-231 Breast Cancer Cell Migration
Tanzila Islam¹  
¹Washington State University, Pullman, WA

Th-274  Self-assembly of Tumor Spheroids in a Bioprinted Heterogeneous 3D Tumor Stroma Model
Tao Jiang¹, Jose Gil Munguia-Lopez², Joel Grant¹, Sanahan Vijayakumar¹, and Joseph Kinsella¹  
¹McGill University, Montreal, QC, Canada, ²Instituto Potosino de Investigación Científica y Tecnológica, A.C. (IPICyT), San Luis Potosi, Mexico

Th-275  Melanoma-Induced Endothelial Barrier Disruption via VE-cadherin Disassembly and Cell Contractility
Virginia Aragon-Sanabria¹, Esther Gomez¹, and Cheng Dong¹  
¹The Pennsylvania State University, University Park, PA

Th-276  A Tumor-on-a-Chip Platform Recapitulating Hypoxic Microenvironments
Yuta Ando¹, Daniel Yen¹, Gabriel Rocha¹, and Keyue Shen¹  
¹University of Southern California, Los Angeles, CA

Tracks: Cancer Technologies, Nano and Micro Technologies
Micro/Nano Tools in Cancer (Diagnostics, Treatment)

Th-277  A tumor-on-a-chip Platform for Screening Precision Medicine-driven Therapies
Steven Forsythe¹, Naren Mehta¹, Angela Alistar², Adam Hall¹, and Aleksander Skardal¹  
¹Wake Forest School of Medicine, Winston-Salem, NC, ²Wake Forest Baptist Medical Center, Winston-Salem, NC

Th-278  Multivalent Capture of Tumor Cells Using Microfluidic Devices
Anna Gams¹, Jinling Zhang¹, Weiian Sheng¹, and Z. Hugh Fan¹  
¹University of Florida, Gainesville, FL

Th-279  Smartphone-Compatible Magnetic Focusing for Detection of Circulating Tumor Cells
Ashwini Joshi¹, Reza Amin¹, Stephanie Knowlton¹, Alexander Hart¹, Bekir Yenilmez¹, Chung Yang¹, and Savas Tasoglu¹  
¹University of Connecticut, Storrs, CT

Th-280  Photothermal Therapy Improves the Efficacy of a MEK Inhibitor in the Treatment of Malignant Peripheral Nerve Sheath Tumors
Elizabeth Sweeney¹, Rachel Burga¹, Chaoyang Li¹, Yuan Zhu¹, and Rohan Fernandes¹  
¹Children’s National Medical Center, Washington, DC

Th-281  Optical Surveillance of Multi-Organ Metastatic Lesions using Rare Earth Albumin Nanoprobes
Harini Kantamneni¹, Margot Zevon¹, Laura Higgins¹, Derek Adler¹, Shah Yang², Xinyu Zhao², Mei chee Tan², Mark Pierce², Richard Riman¹, Vidya Ganapathy¹, Charles Roth¹, and Prabhas Moghe²  
¹Rutgers University, New Brunswick, NJ, ²Singapore University of Technology and Design, Singapore, Singapore

Th-282  Rapid, Surface-marker Specific Isolation of Exosomes for the Diagnosis of Cancer, Using Parallelized, Magnetic nanopores
Jina Ko¹, Neha Bhagwat¹, Stephanie Yee¹, Erica Carpenter¹, Ben Stanger¹, and Dave Issadore¹  
¹University of Pennsylvania, Philadelphia, PA
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**TH-283**
A Magnetic Micropore Chip for Rapid (< 1 hour) Unbiased Circulating Tumor Cell Isolation and In-situ RNA Analysis
Jina Ko¹, Neha Bhagwat¹, Stephanie Yee¹, Colleen Redlinger¹, Janae Romeo², Mark O’Hara¹, Arjun Raj³, Erica Carpenter¹, Ben Stanger¹, and Dave Issadore¹
¹University of Pennsylvania, Philadelphia, PA

**TH-284**
Image-guided Radiosensitizing Polymersome Nanoparticles to Track and Treat Surgical Tumors
Murali Ramamoorthy¹, Sanaz Ebrahimi Samani¹, Simon Tran¹, and Joseph Kinsella¹
²University of Houston, Houston, TX

**TH-285**
Detection of miRNA 21 and 141 in Prostate Cancer Blood Specimen using Nucleic Acid Sequence Based Amplification Lateral Flow Device
Babatunde James¹, Akinniyi Osuntoki¹, A.A. Oshodi¹, and O.A. Magbagbeola¹
¹University of Lagos, Lagos, Nigeria

**TH-286**
Population-based Detection of Cell Penetrating Peptide Uptake in a Microfluidic Droplet Trapping Array
Nora Safabakhsh¹, Seleipiri Charles¹, Manibarathi vaithiyanathan¹, Riad Elkhanaoui¹, and Adam Melvin¹
¹Louisiana State University, Baton Rouge, LA

**TH-287**
Quantification of Mammalian 5-Hydroxymethylcytosine Content by a Novel Solid-State Nanopore Assay
Osama Zahid¹ and Adam Hall²
¹Wake Forest University School of Medicine, Winston-Salem, United States Minor Outlying Islands, ²Wake Forest University School of Medicine, Winston-Salem, NC, United States Minor Outlying Islands

**TH-288**
Nanotextured Functionalized Substrates for Enhanced Identification of Metastatic Breast Cancer Cells
Nuzhat Mansur¹, Francisco J. Villarreal¹, Mohammad Raziul Hasan¹, Young-Tae Kim¹, and Samir M. Iqbal¹
¹University of Texas at Arlington, Arlington, TX

**TH-289**
Microfluidic Device for Motility and Biochemical Assessment in Parallel Drug Testing
Shiny Amala Priya Rajan¹, Parker Hambright², Aleksander Skardali¹ ³ 4, and Adam Hall⁵ ² ⁴
¹Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²Wake Forest University, Winston-Salem, NC, ³Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, ⁴Comprehensive Cancer Center of Wake, Winston-Salem, NC

**TH-290**
Quantification of Cancer Cell Response to Therapy with Quantitative Phase Microscopy
Dian Huang¹, Diane N.H. Kim¹, Michael Teitel⁶, and Thomas Zangle¹
¹University of California, Los Angeles, Los Angeles, CA

**TH-291**
Preparation of Size-Controlled 3D Glioma Spheroid Models
You Jung Kang¹, Do Young Kim¹, and Sheereen Majd²
¹Pennsylvania State University, University Park, PA, ²University of Houston, Houston, TX

**TH-292**
Portable and Cost-effective Surface Plasmon Resonance Biosensor for Lung Cancer Early Detection
Chang Liu¹, Zijian An¹, Maxwell Eisenbaum¹, Nan Zhang¹, Qiaoqiang Gan¹, and Yun Wu¹
¹State University of New York at Buffalo, Buffalo, NY

**TH-293**
A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures
Colin Hisey¹, Miguel Martinez-Calderon², Oihane Mitxelena-Iribarren², S.M. Olazola², Maite Mijuka², Sergio Arana², and Derek Hansford¹
¹The Ohio State University, Columbus, OH, ²CEIT-IK4 & Tecnun, Donostia-San Sebastian, Spain

**TH-294**
Multifunctional Block Copolymer Nanoparticles for Diagnostics of Folate Receptor-Positive Tumors
Jiahui Zhang¹, Yiming Huang², and Eilaf Egap¹
¹Georgia Institute of Technology & Emory University, Atlanta, GA, ²Emory University, Atlanta, GA

**TH-295**
Erythrocyte Membrane coated Bismuth Nanoparticles for Enhanced X-ray Radiation Therapy
Junjie Deng¹, Seng-Kah Ng¹, and Ming Su¹
¹Northeastern University, Boston, MA

**TH-296**
Cellular Uptake and Cytotoxicity Effects of SERS Tags for Use in Cancer Imaging
Manjari Bhamidipati¹ and Laura Fabris¹
¹Rutgers University, Piscataway, NJ

**TH-297**
Targeted Nanoparticle/Cancer Binding Mediated by Tumor Cell Over-expression of Sialic Acid Analogos.
Qiuyin Ren¹, Mohit Mathew¹, Randall Meyer¹, Kevin Yaremca¹, and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD

**TH-298**
Carboplatin-Complexed and cRGD-Conjugated Unimolecular Nanoparticles for Targeted Ovarian Cancer Therapy
Yuyuan Wang¹, Liwei Wang¹, Guojun Chen¹, and Sarah Gong¹
¹University of Wisconsin-Madison, Madison, WI

**TH-299**
Nano Size Effects for Magnetic Fluid Heating and Magnetic Resonance Imaging
Sheng Tong¹, Chris Quinto², and Gang Bao¹
¹Rice University, Houston, TX, ²Georgia Institute of Technology, Atlanta, GA

**TH-300**
Microfluidic Devices for Mechanical Dissociation and Filtration of Tumor Tissues into Single Cells
Xiaolong Qiu¹, Trisha Westerhof¹, Marissa Pennell¹, Xiaolong Qiu¹, Trisha Westerhof¹, Marissa Pennell¹, Katrina Henrikson¹, Edward Nelson¹, and Jered Haun¹
¹University of California, Irvine, Irvine, CA

**TH-301**
Radiation Enhanced Anti-metastatic Treatment Of Cancer With Radiation
Yuting Qiu¹, Seng Kah Ng¹, and Ming Su¹
¹Northeastern University, Boston, MA

**Track: Cardiovascular Engineering Angiogenesis**

**TH-302**
Quantitative Analysis of HUVEC Tube Formation in Culture Under An Oxygen Gradient
Brice Boudehent¹, Kosuke Tsukada¹, and Kanae Kadokura¹
¹Keio University, Yokohama, Japan

**TH-303**
Inhibition of Mechanosensitive microRNA-199a Therapeutically Enhances Perfusion Recovery and Collateral Arteriogenesis
Joshua Heuslein¹ and Richard Price¹
¹University of Virginia, Charlottesville, VA
Th-304
Shear Stress Modulates Notch Signaling Mediated Vascular Repair
Kyungh In Baek¹
¹University of California Los Angeles, Los Angeles, CA

Th-305
Nanoparticles for Protein Delivery And Gene Therapy: An Alternative Treatment For Hindlimb Ischemia
Linda Noukeli¹, Subhash Banerjee², Leping Tang¹, and Kyta Nguyen¹,²
¹The University of Texas at Arlington, Arlington, TX, ²The University of Texas Southwestern Medical Center, Dallas, TX, Dallas, TX, ³VA North Texas Health Care System at Dallas, Dallas, TX

Th-306
Three-Dimensional Microfluidic Platform to Study the Role of Stromal Cells in Tumor Angiogenesis
Supriya Nagaraju¹, Danh Truong², and Mehdi Nikkhah³
¹Arizona State University, Tempe, AZ, ²Arizona State University, tempe, AZ

Th-307
Alginite Hydrogels for Controlled Release of PRP
Negar Faramarzi¹, Afsoon Fallahi², Jeremy N Ruskin³, and Ali Azadani³
¹University of California Los Angeles, Los Angeles, CA, ²Brigham and Women's Hospital, Cambridge, MA, ³Columbia University, New York, NY

Th-308
The Effect of Media Type On Nerve Presence In Cultured Microvascular Networks With Blood Vessels And Lymphatics
Nicholas Hodges¹, Ryan Barr¹, James Lane¹, and Walter Murfee¹
¹Tulane University, New Orleans, LA

Th-309
Alginate-Chitosan Hydrogels Provide a Sustained Gradient of S1P for Therapeutic Angiogenesis.
Priscilla Williams¹ and Eduardo Silva¹
¹University of California, Davis, Davis, CA

Th-310
Pro- and Anti-angiogenic VEGF-A Splice Variants Bind VEGFRs with Differential Affinities
Spencer Mamer¹, Ashley Wittenkeller¹, and P. I. Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Th-311
Engineering Oriented Microvessels on Aligned Extracellular Matrix Scaffold
Zichen Qian¹, Lijun Zhang¹, Mitch Tahtinen¹, Avik Ghosh¹, Qi Xing¹, and Feng Zhao¹
¹Michigan Technological University, Houghton, MI

Track: Cardiovascular Engineering and Biomechanics

Th-312
Precise Gene Engineering and Drives for Hemoglobinopathies in Disparate, Minority Populations
Faisal Reza¹ and Peter M. Glazer¹
¹Yale University, New Haven, CT

Th-313
Effects of Shear on P-selectin Deposition in Microfluidic Channels
Nesreen Alsmadi¹,², Eddie Shimp³, Christopher Lewis³, Kevin Lam⁴ ⁵, and David Schmidtke¹ ²
¹University of Texas at Dallas, Richardson, TX, ²University of Texas Southwestern, Dallas, TX, ³University of Oklahoma, Norman, OK, ⁴University of Texas at Dallas, Richardson, TX, ⁵University of Texas Southwestern, Dallas, TX

Th-314
Role of Calcium During the Intra- and Extra-Cellular Cleavage of Von Willebrand Factor by ADAMTS13
Sriram Neelamegham¹, Shobhit Gogia⁶, and Anju Kelkar⁶
¹SUNY at Buffalo/ University at Buffalo, Buffalo, NY

Tracks: Cardiovascular Engineering, Biomechanics

Th-315
Patient-Specific Computational Modeling of the Left Atrium and Left Atrial Appendage: Application to Left Atrial Appendage Closure Devices
Shahnaz Javani¹, Peyman Azadani², and Ali Azadani³
¹University of Denver, Denver, CO, ²University of Utah School of Medicine, Salt Lake City, UT

Th-316
The Effect of Limb Flexion on Torsional Deformations and Stresses in the Human Femoropopliteal Artery
Anastasia Desyatova¹, William Poulsen¹, Paul Deegan¹, Carol Lommeth¹, Jason MacTaggart¹, and Alexey Kamenskiy¹
¹University of Nebraska Medical Center, Omaha, NE

Th-317
Patient-Specific Computational Modeling of Hemodynamics in Pulmonary Arterial Hypertension
Byron A Zambrano¹, Nathan Mclean¹, Liang Zhong¹, Ju Le Tan¹, Alberto Figueroa², Lik Chuan Lee³, and Seungik Baek¹
¹Michigan State University, East Lansing, MI, ²National Heart Centre Singapore, ³Duke- NUS Medical School, Singapore, Singapore, ⁴National Heart Centre Singapore, Singapore, Singapore, ⁵University of Michigan, Ann Arbor, MI

Th-318
Aesha Desai¹, Remi Peyronnet⁵, Peter Kohl², and Delphine Dean¹
¹Clemson University, Clemson, SC, ²University Heart Centre Freiburg, Freiburg, Germany, ⁵University of Freiburg, Freiburg, Germany

Th-319
Pre- and Post-Infarct Left Ventricular Myocardium: It’s Compressible.
Eder Medina¹, Devesh Sahu¹, Joseph H. Gorman III², Robert C. Gorman³, and Michael Sacks¹
¹University of Texas-Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

Th-320
An In Vitro Assessment of Cardiac-Emboli Dynamics On Cerebral Perfusion for the Investigation of Vascular Occlusion In Acute Ischemic Stroke
Fiona Malone¹, Patrick Delassus¹, Eugene McCarthy¹, Paul Fahy¹, and Liam Morris¹
¹Galway Mayo Institute of Technology, Galway, Ireland

Th-321
Exercise Decreases Arterial Stiffness and Mediates Effects Of A High-Fat, High-Sugar Diet
Julie Kohn¹, Jenny Ma¹, Shweta Modi¹, Julian Azar¹, Adeline Chen¹, Stephanie Cheng¹, and Cynthia Reinhart-King¹
¹Cornell University, Ithaca, NY

Th-322
Regulation of Human Cardiac Fibroblast Phenotype by Extracellular Matrix Elasticity
Nathan Cho¹, Shadi Razipour¹, and Megan McCain¹
¹University of California Los Angeles, Los Angeles, CA
Track: Cardiovascular Engineering

Computational Modeling in Cardiovascular Systems

Th-323
Hemodynamics of Porcine Left Ventricles before and after Myocardial Infarction
Vivek Vasudevan¹, Low Jia Jun Adriel¹, Sarayu Parimal¹, Smita Sampath², Chih-Liang Chin³, and Choon-Hwa Yap¹
¹National University of Singapore, Singapore, Singapore, Singapore, Singapore, Singapore
²Merck Sharp & Dohme, Singapore, Singapore

Th-324
Modeling Blood Flow Characteristics in Axial Propeller-Pumps Used as Left Ventricular Assist Devices
Alexandra Untaroiu¹, Mihai Bleiziffer², and Antonio Delgado²
¹Tulane University, New Orleans, LA, ²Ochsner Medical Center, New Orleans, LA

Th-325
Prolonged Blood Residence Time on Transcatheter Aortic Valve Leaflets as a Permissive Factor in Valve Thrombosis
Koohyar Vahidkhah¹, Mohammad Barakat¹, Mostafa Abbasi¹, Shahnaz Javan¹, Peyman Azadani², Anwar Tandar², Danny Dvir³, and Ali Azadani¹
¹University of Denver, Denver, CO, ²University of Utah School of Medicine, Salt Lake City, UT, ³St Paul’s Hospital, Vancouver, BC, Canada

Th-326
GPU-Accelerated Hemodynamics Simulations in Vessels with Deformable Walls
Mike Zhu¹, John Gounley¹, and Amanda Randles¹
¹Duke University, Durham, NC

Th-327
Laboratory Development of a Self-Powered FONTAN for Treatment of Congenital Heart Disease
Arka Das¹, Kristin Sverrisdottir¹, Janina Helwig¹, Gabriela Espinoza¹, Shanice Jones¹, Josean Ruiz¹, Eduardo Divo¹, Alan Kassab², and William Decamp³
¹Embry Riddle Aeronautical University, Daytona Beach, FL, ²University of Central Florida, Central Florida, FL

Th-328
3D Simulation of Aortic Valve Hemodynamics Using Coupled CFD and FEM Approaches via ANSYS
Armin Amindari¹, Kadir Kirkkopru¹, Magdi Yacoub², and Huseyin Cagatay Yalcin³
¹Istanbul Technical University, Istanbul, Turkey, ²Imperial College, London, United Kingdom, ³Qatar University, Doha, Qatar

Th-329
An Experimentally Validated Fluid-Structure Interaction Model of Left Ventricular Filling
Jae Ho Lee¹, Amneet Bhatia¹, Boyce Griffith¹, Milad Samaee², and Arvind Santhanakrishnan²
¹University of North Carolina at Chapel Hill, Chapel Hill, NC, ²Oklahoma State University, Stillwater, OK

Th-330
Longitudinal CFD Infers Mechanisms of Thrombus Formation and Abdominal Aortic Aneurysm Expansion
Byron Zambrazano¹, Farhad Jaber¹, and Seungik Baek¹
¹Michigan State University, East Lansing, MI

Th-331
Reduced-Order Simulation of Electric Propagation in Realistic Cardiac Tissue Models
Duong Vu¹ and Kwong Ng¹
¹New Mexico State University, Las Cruces, NM

Th-332
Fluid Mechanics of the Human Fetal Right Ventricle at 20 Weeks Gestation
Hadi Wiputra¹, Chang Quan Lai¹, Guat Ling Lim², Joel Jia Wei Heng¹, Guo Lan¹, Sanah Merchant Soomar³, Arijit Biswas³, Citra Nurfarah Zaini Mattar³, Hwa Liang Loe¹, and Choon-Hwa Yap¹
¹National University of Singapore, Singapore, Singapore, Singapore, ²National University Health Systems, Singapore, Singapore

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Ebers, DaVinci and Euler: Can We Calculate the Pulse? Assumptions, Challenges and Opportunities in Modeling of Aortic Flow
Hisham Sherif¹
¹Christiana Hospital, Newark, DE, ²University of Delaware, Newark, DE

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Effects of Weight Function on Element Free Galerkin Simulation of Cardiac Propagation
Ian Sturdevant¹ and Kwong Ng¹
¹New Mexico State University, Las Cruces, NM

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Shear Stress Induced NO Production Model: Effect of Spatial Heterogeneity in enos and CCE Channels.
Jaimit Parikh¹, Kenneth Barbee¹, Donald Buerkl¹, and Dov Jaron¹
¹Drexel University, Philadelphia, PA

Th-336
Vortex Analysis of Intra-Aneurismal Hemodynamics in Cerebral Aneurysms
Kevin Sunderland¹ and Jingfeng Jiang¹
¹Michigan Technological University, Houghton, MI

Th-337
A Computational Study of Role of Ascorbate in Improving Endothelial Dysfunction
Sheetal Joshi¹ and Mahendra Kavadia¹
¹Wayne State University, Detroit, MI

Th-338
Effects of Cardiac and Respiration Movements on Relative Phrenic Nerve Displacements
Maria Burbano¹, Lars Mattison¹, and Paul laizoo¹
¹University of Minnesota, Minneapolis, MN

Th-339
Effects of Turbulent Eddies on Hemolysis in a Centrifugal Blood Pump
Mesude Ozturk¹, Edgar O’Rearl¹, Margaret Heck¹, Madison James¹, and Dimitrios Papavassiliou¹
¹University of Oklahoma, Norman, OK

Th-340
Modeling the Effects of Volatile Anesthetics on L-type Ca2+ Channels and Ca2+ Induced Ca2+ Release in Cardiac Myocytes
Neeraj Manhas¹, Guilherme Garcia¹, Venkat Pannala¹, Wai Meng Kwo¹, Amadou K.S Camara¹, and Ranjan K Dash¹
¹University of Oklahoma, Norman, OK

Th-341
Red Blood Cells Oxygen Transport in the Veto-placental Vasculature System of the Placenta
Zhenxing Wu¹ and Parisa Mirbod¹
¹Clarkson University, Potsdam, NY

Th-342
A Novel Computational Model of the Carotid Artery to Determine Fluid Dynamic Effects on Plaque Instability
Scott Hyneel¹, Kristy Cosgrove¹, T. Cooper Woods³, Hernan Bazan³, and Damir Khismatullin¹
¹Tulane University, New Orleans, LA, ²Ochsner Medical Center, New Orleans, LA, ³Tulane Medical School, New Orleans, LA
Tracks: Cardiovascular Engineering, Biomechanics

**Cardiovascular Biomechanics**

**Th-343**
Computational Analysis of Functional Mitral Regurgitation Repair Using Annuloplasty and Papillary Muscle Reposition  
Thuy Pham¹, Fanwei Kong¹, Charles Primiano², John Elefteriades³, and Wei Sun¹  
¹Georgia Institute of Technology, Atlanta, GA, ²Hartford Hospital, Hartford, CT, ³Yale Hospital, New Haven, CT

**Th-344**
A Mathematical Model for the Role of N2O3 in Enhancing Nitric Oxide Following Nitrite Infusion  
Yien Liu¹, Donald Buerk², Kenneth Barbee³, and Dow Jaron³  
¹Drexel University, Philadelphia, PA

**Th-345**
Attribute-rich Models of the Mitral Valve Leaflets for Patient-specific Simulations  
Amir Khalighi¹, Andrew Drach¹, Robert C. Gorman², Joseph H. Gorman³, and Michael S. Sacks¹  
¹The University of Texas as Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

**Th-346**
Stochastic Models of the Mitral Valve Chordae Tendineae for High-fidelity Simulations  
Amir Khalighi¹, Andrew Drach¹, Robert C. Gorman², Joseph H. Gorman³, and Michael S. Sacks¹  
¹The University of Texas as Austin, Austin, TX, ²University of Pennsylvania, Philadelphia, PA

**Th-347**
Impact of Chronic Pulmonary Embolization on Arterial Stiffening  
Ashley Mulchrone¹, Omid Forouzan¹, Kenneth Barbee³, and Naomi Chesler¹  
¹University of Wisconsin-Madison, Madison, WI, ²San Jose State University, San Jose, CA, ³Northwestern University, Chicago, IL

**Th-348**
Head Torsion is Necessary for Cardiac S-looping  
Ashok Ramasubramanian¹  
¹Union College, Schenectady, NY

**Th-349**
Basement Membrane Remodeling Affects Contractile Mechanics to Increase Cardiac Function with Age  
Ayla Sessions¹, Gaurav Kaushik¹, Sarah Parker², Koen Raedschelders², Rolf Bodmer¹, Jennifer E. Van Eyk³, and Adam Engler¹  
¹University of California, San Diego, La Jolla, CA, ²Cedars-Sinai Medical Institute, Los Angeles, CA, ³Sanford Burnham Prebys Medical Discovery Institute, La Jolla, CA

**Th-350**
Investigating The Viscoelastic Properties of Tricuspid Valve Leaflets and Chordae Tendineae  
Sallie Lin¹, Katherine Copeland¹, Bryn Brazile¹, Heath Baskin¹, Raj Prabhu¹, Lakshes Williams¹, Ge Zhang¹, and Jun Liao¹  
¹Mississippi State University, Mississippi State, MS, ²University of Akron, Akron, OH

**Th-351**
Modeling the Circumferential Changes of the Pulmonary Arteries in a PAH-Animal Model within the QLV Framework  
Daniela Velez-Rendon¹, Erica Pursell¹, and Daniela Valdez-Jasso¹  
¹University of Illinois at Chicago, Chicago, IL, ²University of Wisconsin-Madison, Madison, WI, ³San Jose State University, San Jose, CA, ²Boston University, Boston, MA, ³Boston Children’s Hospital, Boston, MA

**Th-352**
Right Ventricular Pressure-Volume Loop Analysis During Exercise in a Patient with PAH  
Eric Dingels¹, Heather Shumaker¹, Alessandro Bellofiore², Jeanette Cheng³, Sanjiv Shah¹, and Naomi Chesler¹  
¹University of Wisconsin-Madison, Madison, WI, ²San Jose State University, San Jose, CA, ³Northwestern University, Chicago, IL

**Th-353**
Axial Contributions of the Left and Right Pulmonary Arteries in Pulmonary Arterial Hypertension  
Erica Pursell¹, Daniela Velez-Rendon¹, and Daniela Valdez-Jasso¹  
¹University of Illinois at Chicago, Chicago, IL

**Th-354**
Mechanical Analysis of Venous Valves for Pediatric Heart Valve Replacement  
Erin Roberts¹, Peter Hammer¹, Breanna Piekar斯基¹, Joyce Wong¹, and Sitaram Emami²  
¹Boston University, Boston, MA, ²Boston Children’s Hospital, Boston, MA

**Th-355**
Numerical Simulation of Pulmonary Autograft Remodeling after Ross Procedure  
Yue Xuan¹, Andrew Wisneski¹, Hayes Mohgahdam¹, Elaine Tseng¹, and Liang Ge¹  
¹University of California San Francisco, San Francisco, CA

**Th-356**
Topological and Geometrical Analyses of 3D Epicardial Elastin Fiber Network  
Xiao dan Shi¹, Song Zhang¹, Katherine Copeland¹, Yue Liu², Huajian Gao², and Jun Liao¹  
¹Mississippi State University, Mississippi State, MS, ²Brown University, Providence, RI

**Track: Cardiovascular Engineering Heart Valve Structure, Function, and Disease**

**Th-357**
Characterization of Three-dimensional Anisotropic Heart Valve Tissue Mechanical Properties at Various Rates of Deformation  
Mustafa Abbasi¹, Mohammad Barakat¹, Koohyar Vahidkhah¹, and Ali Azadani²  
¹University of Denver, Denver, CO

**Th-358**
Overexpression of Catalase Impairs Aortic Valve Function and Accelerates Valvular Calcification in Mice  
Caitlin Fermyole¹, Carolyn Roos¹, Grace Casalang-Verzosa¹, Bin Zhang¹, and Jordan Miller¹  
¹Mayo Clinic, Rochester, MN

**Th-359**
Flow Field in Critical Aortic Valve Stenosis in Infants  
Elnaz Pour Issa¹, Alexander T. Williams¹, Sana Nasim¹, Arash Moshkforoush¹, Denise Medina¹, Lilliam Valdes-Cruz², Steven Bibelevski², Frank Scholl³, Nikolaos Tsoukias¹, and Sharan Ramaswamy¹  
¹Florida International University, Miami, FL, ²Joe DiMaggio Children’s Hospital, Hollywood, FL

**Th-360**
Time Profile Analysis of Conventional Plain Geometric Orifice Area and Edged Geometric Orifice Area for Artificial Heart Valves  
Kwonsoo Chun¹, Samir Saidi², Daniel Harrington³, and Henri Justino³  
¹Baylor College of Medicine, Houston, TX, ²Rice University, Houston, TX, ³Baylor College of Medicine, Houston, TX
Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Track: Cellular and Molecular Bioengineering**

**Cell Adhesion and Interactions with the Extracellular Matrix**

**Th-371**
*In Vitro Validation of a Computational Model of Fibronectin Assembly*
Devin Mair¹, Thomas Petet¹, Lewis Scott¹, Seth Weinberg¹, and Christopher Lemmon¹
¹Virginia Commonwealth University, Richmond, VA

**Th-372**
*Myofibroblast Differentiation in Response to Conformational Changes in Fibronectin’s Integrin Binding Domain*
Haylee Bachman¹, Gulcin Arslan², and Thomas Barker²
¹Georgia Institute of Technology, Atlanta, GA, ²Ege University, Izmir, Turkey

**Th-373**
*Non-Enzymatic Selective Osmotic Shock for The Isolation Of Human Islets*
Kevin Enck¹,², John McQuillinger¹,², Sittadjody Sivanandane³, and Emmanuel Opara¹,²
¹Wake Forest University, Winston-Salem, NC, ²WFIRM, Winston-Salem, NC

**Th-374**
*Thiol-ene Hydrogels as a Tool for Studying Macrophage Phagocytic Activity and Infection*
Kirsten Brink¹, Adam Navara¹, Paul de Figueiredo¹, and Daniel Alge¹
¹Texas A&M University, College Station, TX

**Th-375**
*Mechanophenotype Influences Cellular Organization and Morphology*
Manisha Kanthila¹ and Eric Darling¹
¹Brown University, Providence, RI

**Th-376**
*A Novel Approach of Simulating Directed Cell Migration towards the Stiffest ECM*
Min-Cheol Kim¹, Rohan Abeyaratne², Roger D. Kamm¹, and H. Harry Asada¹
¹Massachusetts Institute of Technology, Cambridge, MA

**Th-377**
*Engineered Intestinal Microenvironments as Preclinical Drug Screening Platforms*
Ruby Dewi¹, Rebecca DiMarco¹, and Sarah Heilshorn¹
¹Stanford University, Stanford, CA

**Th-378**
*Band 3 Inhibitor as a Mediator of Erythrocyte Aggregation during the Onset of Thermal Burn Injury*
Samantha WeberFishkin¹, Harrison Seidner¹, Geoffrey Gunter², Semih Kuriç³, and Mary Frame⁴
¹Stony Brook University, Stony Brook, NY, ²Aresta Associates, Los Angeles, CA

**Th-379**
*Role of E-Cadherin Adhesion In The Assembly Of Nascent Desmosomes*
Omer Shafraz¹, Sarah Stahley², Andrew Kowalczyk³, and Sanjeevi Sivasankar¹
¹Iowa State University, Ames, IA, ²Emory University School of Medicine, Atlanta, GA

**Th-380**
*Effects of G to A Mutagenesis on Murine Leukemia Virus Gag Oligomerization*
Vikram Puram¹, Megan Roth¹, Jessica Martin¹, and Louis Mansky¹
¹University of Minnesota-Twin Cities, Minneapolis, MN
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| **Th-381** Automated Tracking of Wound Healing in Endothelial Cells Cultured on Different Substrates | Olga Chashchina¹, Valentin Laplau¹, Elizabeth Antoine¹, and Abdul Barakat¹  
¹Ecole Polytechnique, Palaiseau, France |
| **Th-382** Altering Cell Behavior and Morphology With Highly Ordered Nanostructured Surfaces | Amy Manz¹, Charles Rice¹, Derek Sekora¹, Eva Franke-Schubert¹, Mathias Schubert¹, and Angela Pannier¹  
¹University of Nebraska-Lincoln, Lincoln, NE, ²Center for Nanohybrid Functional Materials, Lincoln, NE |
| **Th-383** Investigating Macrophage Plasticity and Migration in a 3D Wound Healing Model | Andrew Ford¹ and Padma Rajagopalan¹  
¹Virginia Tech, Blacksburg, VA |
| **Th-384** Characterization of Rho GDP- dissociation Inhibitor (RhoGDI) Function in Platelets | Anh Ngo¹, Owen McCarty¹, and Joseph Aslan¹  
¹Oregon Health and Science University, Portland, OR |
| **Th-385** Segregation of Mobile Nuclear Proteins Away from Chromatin When The Nucleus Is Constricted | Charlotte Pfeifer¹, Jerome Irianto¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA |
| **Th-386** Cell Spreading Dynamics on Colloidal Thin Films | Daniel Chester¹ and Ashley Brown¹  
¹North Carolina State University and the University of North Carolina at Chapel-Hill, Raleigh, NC |
| **Th-387** Implications of Vasomotor Remodeling Effects on the Quantity and Quality of Monocyte Adhesion in Flow | Erin Edwards¹,² and Susan Thomas¹  
¹Georgia Institute of Technology, Atlanta, GA, ²Georgia Institute of Technology & Emory University, Atlanta, GA |
| **Th-388** Genomic Variation in an Osteosarcoma Cell Line Caused by Pore Migration | Jerome Irianto¹, Charlotte R. Pfeifer¹, Yuntao Xia¹, Avathamsa Athirasala¹, Manu Tewari¹, Roger E. Greenberg¹, and Dennis E. Discher¹  
¹University of Pennsylvania, Philadelphia, PA |
| **Th-389** Insight in Constricted Cell Migration: Tension on the DNA and Inhibition of Nuclear Processes | Jerome Irianto¹, Charlotte R. Pfeifer¹, Yuntao Xia¹, Roger E. Greenberg¹, and Dennis E. Discher¹  
¹University of Pennsylvania, Philadelphia, PA |
| **Th-390** Expression of Mechanosensitive Channel of Large Conductance (MscL) in Mammalian Metastatic Cancer Cells for Study and Disruption of migration in narrow 3D confinements | Johanna Heureaux¹  
¹University of Michigan Ann Arbor, Ann Arbor, MI |
| **Th-391** Collagen Fibrils Attached to Flexible Substrates Reveal the Role of Mechanics on Contact Guidance | Juan Wang¹, Jacob Nuhn¹, Anuraag Bodduapalli¹, Katie Bratlie¹, and Ian Schneider¹  
¹Iowa State University, Ames, IA |
| **Th-392** Osteoblast vs. MSC Migration under Fluid Shear | Brandon Riehl¹, Jeong Soon Lee¹, Liygeom Ha¹, and Jung Yu Lim¹  
¹University of Nebraska-Lincoln, Lincoln, NE |
| **Th-393** Regulation of Chlamydomonas Flagella and Ependymal Cell Motile Cilia by Ceramide-Mediated Translocation of GSK3 | Kara Hardin¹,²  
¹Georgia Institute of Technology, Atlanta, GA, ²Medical College of Georgia, Augusta, GA |
| **Th-394** Cell Division Dictates Patterns of Emergent Collective Angular Motion in Multicellular Tissues | Michael Siedlik¹, Sriram Manivannan¹, Ioannis Kevrekidis¹, and Celeste Nelson¹  
¹Princeton University, Princeton, NJ |
| **Th-395** A Computational Model to Predict How Chemokine Binding to Extracellular Matrix and Cell Arrangements Influence 3D Gradients and Cancer Cell Migration | Phillip Spinosa¹, Kathy Luker¹, Gary Luker¹, and Jennifer Linderman¹  
¹University of Michigan, Ann Arbor, MI |
| **Th-396** A 3D Multiplex Platform for Single Cell Chemotaxis | Steven Roberts¹ and Nitin Agrawal¹  
¹George Mason University, Fairfax, VA |
| **Th-397** Mechanical Interactions between Cells and Substrate Regulate Collective Migration | Abdel-Rahman Hassan¹, Thomas Biel¹, and Taeyoon Kim¹  
¹Purdue University, West Lafayette, IN |
| **Th-398** Inhibition of a DNA Repair Kinase ATM Leads to Cell Death in 3D Migration Independent of DNA Damage | Jerome Irianto¹, Yuntao Xia¹, Charlotte Pfeifer¹, Jiazheng Ji¹, Roger A. Greenberg¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA |

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**Track: Cellular and Molecular Immunoengineering**

| **Th-399** Paired Heavy and Light Chain Antibody Repertoire Analysis to Inform Rational Vaccine Design | Brandon Dekosky¹  
¹NIAID, Bethesda, MD |
| **Th-400** Engagement Leads to Accumulation of Engineered Marrow Macrophages in a Rapid and Selective Clearance of Tumor Cells | Cory Alvey¹, Kyle Spinler³, Jerome Irianto¹, Charlotte Pfeifer¹, Yuntao Xia¹, Sakyun cho¹, Dave Dingal¹, Jake Hsu¹, Manu Tewari¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA, ²University of California San Diego, La Jolla, CA |
**Microenvironment Stiffness as A Control Mechanism of Phagocytosis By Tumor-Associated Macrophages**

Jake Hsu¹, Cory Alvey¹, Yuntao Xia¹, Jerome Irianto¹, and Dennis Discher¹

¹University of Pennsylvania, Philadelphia, PA

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**Characterization of Human Stem Cell Derived Neutrophils**

Laurel Hind¹, David Bennin¹, and Anna Huttenlocher¹

¹University of Wisconsin-Madison, Madison, WI

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**A Microscale Testbed to Assay And Manufacture CAR T-Cell Immunotherapies**

Nicole Piscopo¹, Kirsti Walker¹, Yasmin Alvarez-Garcia¹, Loren Stallcop¹, David Beebe¹, Christian Capitini¹, and Krishanu Saha¹

¹University of Wisconsin-Madison, Madison, WI

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**Cellular Backpacking as a Novel Tool for Nanoimmunotherapy**

Rachel Burga¹ ², Catherine Bollard¹ ², C. Russell Cruz¹ ², and Rohan Fernandes² ³

¹Children’s National Health System, Washington, DC, ²George Washington University, Washington, DC

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**Cell-Based FRET Biosensor For High-Throughput Screening Of Small Molecule Inhibitors Of Tumor Necrosis Factor Receptor 1 (TNFR1)**

Chih Hung Lo¹, Andrew Lewis¹, Tory Schaaf², Benjamin Grant³, Nagamani Vunnam¹, Prachi Bawaskar³, David Thomas³, ⁴, and Jonathan Sachs¹

¹Department of Biomedical Engineering, University of Minnesota, Minneapolis, MN, ²Department of Biochemistry, Molecular Biology and Biophysics, University of Minnesota, Minneapolis, MN, ³Fluorescence Innovations Inc., Minneapolis, MN, ⁴Photonic Pharma LLC, Minneapolis, MN

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**Unifying Cellular Bioelectromagnetic Phenomena: Dielectrophoresis and Electroporation**

Daniel Sweeney¹, Temple Douglas², and Rafael Davalos²

¹Virginia Tech, Blacksburg, VA, ²Virginia Polytechnic Institute and State University, Blacksburg, VA

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**Cytoskeleton Mediated Alterations in Nuclear Morphology And Dimension**

Dong-Hwee Kim¹,², Bo Li³,², Jung-Won Park¹, Denis Wirtz², and Sean X. Sun²

¹Korea University, Seoul, Korea, Republic of, ²Johns Hopkins University, Baltimore, MD, ³Tsinghua University, Beijing, China, People’s Republic of

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**Stratum Corneum Lipid Composition Alters the Heterogeneous Growth of Staphylococcus Aureus**

Joseph Cleary¹, Minyoung Kim¹, Claudia Marques¹, and Guy German¹

¹Binghamton University, Binghamton, NY

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**Muc1-induced Microvesicle Shedding in Breast Cancer: A Biophysical Phenomenon**

LaDeidra Monet Roberts¹, Carolyn Shurer¹, Michael Holland¹, and Matthew Paszek¹

¹Cornell University, Ithaca, NY

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**Changes in Triglyceride-Rich Lipoprotein Composition in Response to a High-Fat Meal Promote Endothelial Inflammation in Hypertriglyceridemic Subjects**

Anita Rajamani¹, Andrea Fernandez¹, Ying Wang¹, Chongxiu Sun¹, Scott Simon¹, and Anthony Passerini¹

¹University of California, Davis, Davis, CA

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**A Novel Pulsing Protocol Based on Cancellation of Cancellation Effect**

Enbo Yang¹, Chunrong Zhou¹, Andrei Pakhomov¹, and Shu Xiao¹

¹Old Dominion University, Norfolk, VA

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**Protein Characterization of Formalin-Fixed, Fluorescence-Activated Sorted Cell Subpopulations**

Jessica Sadick¹, Molly Boutin¹, Diane Hoffman-Kim¹, and Eric Darling¹

¹Brown University, Providence, RI

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**Ice Formation Characteristics during Cryopreservation with Trehalose as an Additive**

Jason Solociniski¹, Quinn Osgood¹, Mian Wang¹, and Nilay Chakraborty¹

¹University of Michigan Dearborn, Dearborn, MI
**Th-420**
Estimation of Intracellular pH at Low Temperatures: Implications in Cryobiology  
Eric Rosiek¹, Manal Makki¹, Quinn Osgood¹, Ben Li¹, and Nilay Chakraborty¹  
¹University of Michigan Dearborn, Dearborn, MI

**Th-421**
Combination Antimicrobial Efficacy of Non-thermal Jet Plasma and Chlorhexidine (CHX) Digluconate on Pseudomonas Aeruginosa Biofilm  
Tripti Thapa¹ and Halim Ayan¹  
¹University of Toledo, Toledo, OH

**Th-422**
Simulation on Calcium Inflow via Pathways of Cell Membrane in Response to 600ns Electrical Pulse  
Wanfei Bo¹, Haiong Yin¹, Jingchao Tang¹, and Yubin Gong¹  
¹University of Electronic Science and Technology of China, Chengdu, China, People's Republic of

**Th-423**
Quantifying Macrophage Protease Secretion Reveals Variability in Rates, Production, and Stability  
Ken Brandon¹,², W. Andrew Shockey³, and Manu O. Platt³  
¹Oakwood University, Huntsville, AL, ²University of Alabama-Huntsville, Huntsville, AL, ³Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory University, Atlanta, GA

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**Track: Device Technologies and Biomedical Robotics**

**Affordable Health Devices and Frugal Innovation**

**Th-424**
Phone's Application as Seizures Alarm for Epilepsy Patients  
Daniel Jimenez-Mendoza¹, Jose de Jesus Bernal-Alvarado¹, Ma. Isabel Delgadillo-Holtfort¹, and Jose Marco Balleza Ordaz¹  
¹Universidad de Guanajuato Campus Leon, Leon, Guanajuato, Mexico

**Th-425**
Development of Low-cost Impedimetric Biosensors for Clinical Diagnostics and Water Testing  
Jacqueline Rohde¹, Andrew Cobb¹, Ryan Gilbert¹, Zachary Hawks¹, John DesJardins¹, and Delphine Dean¹  
¹Clemson University, Clemson, SC

**Th-426**
An Automated Selective Condenser for Collection of Glucose in Exhaled Breath  
Divya Tankasala¹, Laura Jamicich¹, Shubhankar Takle¹, Ann Rundell¹, and Jacqueline Linnes¹  
¹Purdue University, West Lafayette, IN

**Th-427**
A Smartphone Device and App for Self-Monitoring Blood Alcohol Content (BAC)  
Alex Hille¹, Vivian Ramirez¹, John Gendi¹, Marvin Packer², and Herbert Voigt¹  
¹Boston University, Boston, MA, ²Harvard Vanguard Medical Associates Atrius, Boston, MA

**Th-428**
Design and Testing of a Novel Anesthetic Gas Analyzer for use in Low-Resource Areas  
Patrick Kolbay¹, Joseph Orr¹, and Kai Kück¹  
¹University of Utah, Salt Lake City, UT

**Th-429**
Behavioral Analysis Automation for Music and Emotion-based Robotic Therapy for Children with ASD  
Rachael Bevillⁿ¹, Srineel Nizambah¹, Chung Hyuk Park¹, Myoungsoon Jeon², and Ayanna Howard³  
¹The George Washington University, Washington, DC, ²Michigan Technological University, Houghton, MI, ³Georgia Institute of Technology, Atlanta, GA

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**Track: Device Technologies and Biomedical Robotics**

**Biosensors**

**Th-430**
Establishing The Basis for Quantitative Spark-Induced Breakdown Spectroscopy (SIBS) Toxin Detection Technology  
Carmen Gondhalekar¹, Eva Biela¹, Bartek Rajwa¹, Euiwon Bae¹, Valery Patsekin¹, Jennifer Sturgis¹, Huisung Kim¹, Ylli-Joon Doh¹, Larry Stanker², and Paul Robinson¹  
¹Purdue University, West Lafayette, IN, ²USDA, ARS, Albany, CA

**Th-431**
Electrochemical Detection of Pseudomonas aeruginosa in Polymicrobial Environments  
Clara Romero Santiveri¹, Hunter Sismaet¹, and Edgar Goluch¹  
¹Northeastern University, Boston, MA

**Th-432**
Point of Care Multimarker Sensor for Trauma  
David Probst¹ and Carissa Henricksen²  
¹Arizona State University, Chandler, AZ, ²Michigan Technological University, Houghton, MI

**Th-433**
Design of a Micro-interdigitated Electrode Array for High-throughput Biomarker Quantification  
Vidura Jayasooriya¹ and Dharmakeerthi Nawarathna¹  
¹North Dakota State University, Fargo, ND

**Th-434**
Progress Toward an Optical Cavity Based Sensor with a Chained Differential Detection through Refractive Index Measurements  
Seunghyun Kim¹, Donggee Rho¹, and Jess Lichtenberg¹  
¹LeTourneau University, Longview, TX

**Th-435**
A Miniaturized LTCC-based pH Sensing System  
Houssem Eddine Amor¹,², Paul Marsh¹, Achraf Ben Amar², Ammar Kouki², and HUNG CAO¹  
¹University of Washington Bothell, Seattle, WA, ²École de technologie supérieure, Montreal, QC, Canada

**Th-436**
Rapid Antimicrobial Susceptibility Testing at the Single Cell Level  
Hui Li¹, Yi Lu¹, and Pak Wong¹  
¹The Pennsylvania State University, University Park, PA

**Th-437**
Electrochemical Detection of Clinical Pseudomonas aeruginosa Isolates using AC Voltammetry  
Hunter Sismaet¹, Elizabeth Hirsch¹, and Edgar Goluch¹  
¹Northeastern University, Boston, MA

**Th-438**
Novel Measurement of Intra-Abdominal Pressure in Women during Daily Activities and Exercise  
Johanna de Gennaro¹, Stefan Niederauer¹, Tanner Coleman¹, Tomasz Petelenz¹, and Robert Hitchcock¹  
¹University of Utah, Salt Lake City, UT
An Ultrasensitive Biosensor for Rapid Viral Pathogen Detection
Lei Wang¹, Milena Veselinovic¹, Lang Yang¹, Brian Geiss¹, Tom Chen¹, and David Dandy¹
¹Colorado State University, Fort Collins, CO

DNA Detection Based on Nanoplasmon-Enhanced Molecular Beacons
Akash Kannegulla¹, Ye Liu¹, and Li-Jing Cheng¹
¹Oregon State University, Corvallis, OR

Highly Sensitive Nucleic Acid Detection Using Quantum Dot- Fullerene Based Molecular Beacons
Ye Liu¹, Akash Kannegulla¹, and Li-Jing Cheng¹
¹Oregon State University, Corvallis, OR

Salmonella Detection Using Magnetic Sensors: High Sensitivity and High Throughput
Maria Torija¹, Kevin Dorfman², Lorena Maldonado-Camargo³, Carlos Rinaldi³, Julian Sheats², Mark Tondra⁵, and Peter Mueller⁴
¹NVE Corporation, Eden Prairie, MN, ²University of Minnesota, Minneapolis, MN, ³University of Florida, Gainsville, FL, ⁴University of Minnesota, St. Paul, MN, ⁵Diagnostic Biosensors, St. Paul, MN

Directed Irradiation Synthesis On Surface Topography and Biosensing Properties Of TiO₂-coated Photonic Crystal (PC) Fluorescence Biosensors
Ming Kit Cheng¹, Akshath Shetty¹, and Jean Allain¹
¹University of Illinois Urbana Champaign, Urbana, IL

Acquisition of Inter-Abdominal Pressure as a Predictor of Pelvic Floor Disorder in Post-Partum Women
Stefan Niederauer¹, Johanna de Gennaro¹, Robert Hitchcock¹, and Tomasz Petelenz¹
¹University of Utah, Salt Lake City, UT

The Effect of Distribution of Facial Surface Points on Target Registration Error in Contour-based Registration for Neuronavigation
Hyun-Joon Park¹, Teayong Sim¹, Hakje Yoo¹, Ahnryul Choi¹, Ki-Young Shin², and Jong Hwan Mun¹
¹Sungkyunkwan University, Suwon, Korea, Republic of, ²Korea Electro-technology Research Institute, Ansan, Korea, Republic of

Hand-Held Device for the Location of Sentinel Node Biopsy Markers in Breast Cancer Surgery
Cody Jordan¹, Joseph Wilson¹, Scott Slaney¹, Lucas Schmidt¹, Vipul Raikar¹, Melissa McCullough¹, Nancy Demore¹, and Delphine Dean¹
¹Clemson University, Clemson, SC, ²Medical University of South Carolina, Charleston, SC

Fingerprinting Technology Measuring Stimulated Sweat Secretion Rate to Diagnose Cystic Fibrosis
Yu-Hao Peng¹, Daniel B Salinas¹, and Jean-Michel Maarek¹
¹University of Southern California, Los Angeles, CA, ²Children Hospital Los Angeles, Los Angeles, CA

Improving Poly(p-dioxanone) Strength Retention in a Novel Implantable Wound Closure Device
Jesse Butch¹, Daniel Mazzucco¹, and Julian Trowbridge¹
¹ZSX Medical, Philadelphia, PA

Lab-on-a-chip Self-assembly of Fluorescent Peptide-based Nanoparticles for Blood-based Diagnosis of Alzheimer’s Disease
Leming Sun¹, Zhen Fan¹, Tao Yue¹, Jesse Fine¹, Eun-Mee Lee¹, Rebecca Davis¹, Jeff Kuret², Douglas Scharre², and Mingjun Zhang¹
¹Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, ²Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH, ³Department of Molecular and Cellular Biochemistry, The Ohio State University College of Medicine, Columbus, OH

First Pass Metabolism of Acetaminophen on a Modular, Low Cost, Two Tissue Body-on-a-chip Platform
Yang Yang¹ and Mandy Esch¹
¹Syracuse University, Syracuse, NY

Designing A Rapidly Responding Actuation for Medical Robotic Exoskeleton Joints.
Yousuf Alshahrani¹, Chaoyan Chen¹, Yang Zhou¹, Pan Tian¹, Jie Hu², Jin Qi², John Cavanaugh¹, and Mark Ming-Cheng Cheng¹
¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of

Evaluating Exoskeleton Assistance using Instantaneous Metabolic Cost Measures
Richard Nuckolls¹, Tracy Giest¹, and Gregory Sawicki¹
¹UNC Chapel Hill and NC State University, Raleigh, NC

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Fingerprinting Technology Measuring Stimulated Sweat Secretion Rate to Diagnose Cystic Fibrosis
Yu-Hao Peng¹, Daniel B Salinas¹, and Jean-Michel Maarek¹
¹University of Southern California, Los Angeles, CA, ²Children Hospital Los Angeles, Los Angeles, CA

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¹UNC Chapel Hill and NC State University, Raleigh, NC
Track: Translational Biomedical Engineering

Models, Phantoms and Surrogates for Device Validation

**Th-455**
Computational and Experimental Models of Prosthetic Heart Valve Dynamics
Boyce Griffith¹, Ebrahim Kolahdouz¹, Amneeet Bhalla¹, Thomas Caranasos², and Lawrence Scetten³
¹University of North Carolina at Chapel Hill, Chapel Hill, NC,
²University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, NC,
³VSI, Victoria, BC, Canada

**Th-456**
In Vitro System for Testing Optical Heart Rate Monitors
Kevin Bellows¹,², Cody Lewis², Richard Horner³, Lee Hudson³, John Hanks¹,², and Gerard Coté¹,²
¹Texas A&M University, College Station, TX,
²Texas A&M Engineering Experiment Station, College Station, TX

**Th-457**
Creating a Validation Dataset for Intracranial Pressure Monitoring Metrics using Gaussian Fitting
Maria Qadri¹, Shabbar Danish⁰, and William Craelius¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ,
²Rutgers-Robert Wood Johnson Medical School, New Brunswick, NJ

**Th-458**
Dynamic Myocardial Phantom for the Calibration of Multimodal Imaging Protocols and Modeling Methods
Hiba Shahid¹, Joshua Au¹, Nathan Cornwell¹, Viraat Goel¹, Pierce Hadley¹, Alexander Hasanain¹, Jacob Haynie¹, Boeun Hwang¹, Joshua Lew¹, Bara Saadah¹, Teresa Yang¹, Hugh Yeh¹, Brad Sutton¹, and Lawrence W. Dobrucki¹,²
¹University of Illinois at Urbana-Champaign, Urbana, IL,
²Beckman Institute of Advanced Science and Technology, Urbana, IL

**Th-459**
In Vitro Neurovascular Model Development for Accurate Biomaterials Testing and Characterization
Anne Marie Holter¹, Timothy Becker¹, Kayla Goodrich¹, and Connor Gonzalez¹
¹Northern Arizona University, Flagstaff, AZ

Track: Translational Biomedical Engineering

Translational Biomedical Engineering

**Th-460**
Upregulation of IRF5 In Inflammatory Monocytes Promotes Phenotype Switching During Recruitment On Aortic Endothelium.
Alfredo Hernandez¹
¹UC Davis, Davis, CA

**Th-461**
Synergistic Ablation of Tumors In Vivo by High-Intensity Focused Ultrasound and Ethanol
Hakm Murad¹, Gray Halliburton¹, Daishen Luo¹, and Damir Khismetullah¹
¹Tulane University, New Orleans, LA

Track: Biomaterials

Integration of Biomaterials and Devices

**Th-462**
Biocompatibility and Adhesion Testing of Hydroxyapatite Coatings Deposited By Sol-gel Dip Coating
Alexander DeHaan¹, Maritza Fuerte¹, and Guna Selvadurai¹
¹San Jose State University, San Jose, CA

**Th-463**
Thermo-Mechanical Properties and Actuation Profiles of Shape Memory Polyurethane-urea Foams
Alexandra Easley¹, Duncan Maitland¹, and Sayyeda M. Hasan¹
¹Texas A&M University, College Station, TX

**Th-464**
Towards Fast & Gentle Cell Isolation: Integrating Microfluidics & Secondary Anchor Targeted Cell Release
Ali Ansari¹ and P. Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Th-465**
Laser Irradiation of Mg Alloys: Reduced Kinetics and Enhanced Biocompatibility
David Florian¹, Michael Melia¹, Fritz Steuer¹, John Scully¹, and James Fitz-Gerald¹
¹University of Virginia, Charlottesville, VA

**Th-466**
Anti-inflammatory Coatings of Hernia Repair Meshes
Dmitry Gil¹, James Rex¹, William Cobb², and Alexey Vertegel¹
¹Clemson University, Clemson, SC, ²Greenville Health System, Greenville, SC

**Th-467**
Microstructured Titanium Surfaces Mediate Markers of Bone Modelling
Ethan M. Lotz¹, Michael B. Berger¹, Zvi Schwartz¹, and Barbara D. Boyan¹
¹Virginia Commonwealth University, Richmond, VA

**Th-468**
Synthesis and Characterization of Biostable Shape Memory Polymer Foam Scaffolds
Grace Fletcher¹, Sayyeda Hasan¹, Andrew Weems¹, Mary Beth Browning Monroe¹, Alexandra Easley¹, and Duncan Maitland¹
¹Texas A&M University, College Station, TX

**Th-469**
Importance of Macrophage Activation in Inflammation and Stem Cell Recruitment Following Biomaterial Implantation
Kelly Hotchkiss¹, Sarah Tracy¹, and Rene Oliveses-Navarrete¹
¹Virginia Commonwealth University, Richmond, VA

**Th-470**
A Gelatin-Based Adhesive Combined with Polydopamine Coating to Enhance Tissue Integration of Medical Implant
Thanh Dinh¹ and Kyung Jae Jeong¹
¹University of New Hampshire, Durham, NH

**Th-471**
Surface Patterning of an Alkylsilane Coated Layer to Control Corrosion Rate of Magnesium Devices
Laura Fulton¹, Avinash Patil¹, and Elia Beniash¹,²,³
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh Department of Oral Biology, Pittsburgh, PA, ³McGowan Institute for Regenerative Medicine, Pittsburgh, PA

**Th-472**
(Moved to Oral Saturday 3-3)
**Thursday, October 6 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC**

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm**

**Th-473**
Osteoclast Mediated Bone Resorption is Attenuated by Modified Titanium Surfaces
Michael Berger¹, Ethan Lotz¹, Sharon Hyzy¹, Barbara Boyan¹ ³, and Zvi Schwartz¹ ³
¹Virginia Commonwealth University, Richmond, VA, ²Georgia Institute of Technology, Atlanta, GA, ³University of Texas Health Science Center at San Antonio, San Antonio, TX

**Th-474**
Novel Hydroxyapatite Coatings Reduced Degradation of Magnesium Implants and Promoted Bone Marrow Mesenchymal Stem Cell Adhesion.
Qioumi Tian¹, Laura Rivera-Castaneda¹, Arash Ashani², and Huinan Liu² ³
¹University of California Riverside, Riverside, CA, ²N² Biomedical LLC, Bedford, MA, ³University of California Riverside, Riverside, CA

**Th-475**
Effects of Sterilization on Shape Memory Polyurethane Embolic Foam Devices
Rachael Muschakek¹, Landon Nash¹, Ryan Jones¹, and Duncan Maitland¹
¹Texas A&M University, College Station, TX

**Th-476**
Towards a Biosective Surface for Treatment of Sepsis in a Hemoperfusion Blood Cleansing Device
Ramya Raman¹, John Lahman¹, Bonan Yu¹, Adam Higgins¹, and Karl Schilke¹
¹Oregon State University, Corvallis, OR

**Th-477**
Preliminary SEM and EDS Analysis of Novel Surface Modification After 1000 Cycles of Wear Testing
Sarah Helms¹, Golnaz Najaf Tomaraei¹, Marian Kennedy¹, and John DesJardins¹
¹Clemson University, Clemson, SC

**Th-478**
Comparison of Large-pore And Small-pore Polypropylene Surgical Mesh: Structural, Mechanical and Histological Analysis
Xinyue Lu¹, Brittney Cotton², Megan Hanschke³, Todd Heniford³, and Melinda Harman³
¹Clemson University, Clemson, SC, ²Carolinas HealthCare System, Charlotte, NC

**Track: Drug Delivery**

**Th-482**
A Novel Platform to Study Particle Deposition in the Lung
Adam Sonnenberg¹, Elizabeth Bartolák-Suki¹, and Béla Suki¹
¹Boston University, Boston, MA

**Th-484**
Study of SN-38 Distribution from Injectable Polymeric Depots in Tumor-Bearing Mice
Chawan Manaspon¹ and Norased Nasongkla¹
¹Mahidol University, Nakorn Pathom, Thailand

**Th-485**
Multifunctional Nanoparticles for Specific Neuroblastoma Targeting
Daniel Quevedo¹ ², Sahar Rahmani¹ ³, Artak Shahnas², Asish Misra³, Domenic Kratzer², Melissa Cadena¹, Hakan Durmaz², and Joerg Lahanni² ³
¹University of Michigan, Ann Arbor, MI, ²Karlsruhe Institute of Technology, Germany, ³Istanbul Technical University, Istanbul, Turkey

**Th-486**
Nanoparticle Targeting During Ex Vivo Perfusion of Human Kidney
Gregory Tietjen¹, Sarah Hosgood², Nancy Kirkiles-Smith¹, Jiajia Cui¹, Eleanor Bolton², John Bradley³, Kourosh Saeb-Parsy³, J. A. Bradley³, M. L. Nicholson², Jordan Pober³, and W. Mark Saltzman¹
¹Yale University, New Haven, CT, ²University of Cambridge, Cambridge, United Kingdom

**Th-487**
Tumor-Targeting Upconversion-Nanoparticle-Based Unimolecular Micelles for Simultaneous Chemotherapy, Photodynamic Therapy, and Fluorescence Imaging for Neuroendocrine Cancer Therapy
Guojun Chen¹, Renata Jaskula-Sztu³, April Harrison³, Corinne Yokoun¹, Liwei Wang¹, Kevin Eliceiri², Herbert Chen³, and Shaoqin Gong³
¹UW-Madison, Madison, WI, ²University of Alabama at Birmingham, Birmingham, AL, ³University of Wisconsin-Madison, Madison, WI

**Th-488**
Chemotherapy of Metastatic Breast Cancer Cells during the Blood-circulating Process by CEACAM6-targeting Albumin Nanoparticles
Hohyeon Lee¹, Hyoukoon Han¹, Minji Lee¹, and Hyuncheol Kim¹ ³
¹Department of Chemical and Biomolecular Engineering, Sogang University, ²Baekbeom-ro, Mapo-gu, Seoul, Korea, Republic of, ³Interdisciplinary program of Integrated Biotechnology, Sogang University, ²Baekbeom-ro, Mapo-gu, Seoul, Korea, Republic of

**Th-489**
Fluid Dynamic Modeling of Intranasal Drug Delivery to the Nasopharyngeal Orifice of the Eustachian Tube
Jennifer Malik¹ and Samir Ghadiali³
¹The Ohio State University, Columbus, OH

**Th-490**
Adaptable Griffiths in Delivery from Polymer Blend Electrospun Fibers
Jinghua Duan¹ and Jill Steinbach-Rankins¹
¹University of Louisville, Louisville, KY

**Th-491**
One-step Versus Two-step Conjugation of Lysine-based ADCs: Comparison Of Payload Loading, Distribution, And Overall ADC Stability
Keith Arlotta¹
¹University of Utah, Salt Lake City, UT

**Th-492**
A11 Minibody-Conjugated, Polypeptide-Based Gold Nanoshells for Targeted Photothermal Therapy
Kevin Chen¹, Kristine Mayle¹, Kathryn Dem¹, Vincent Wong¹, Shijun Song¹, Ke Ding¹, April Rodriguez¹, Scott Knowles¹, Zachary Taylor¹, Hong Zhou¹, Warren Grundfest¹, Anna Wu¹, Timothy Deming¹, and Daniel Kamei¹
¹University of California at Los Angeles, Los Angeles, CA

**Th-493**
Electrospun Polymeric Fibers for Long-Term Protection against HIV and HSV-2
Kevin Tyo¹ and Jill Steinbach-Rankins¹
¹University of Louisville, Louisville, KY

**Th-494**
Functionalization of Endothelial Cells for Magnetically Targeted Delivery to Stented Blood Vessels
Mark Battig¹, Ilia Fishbein¹, Ivan Alferiev¹, Robert Levy¹, and Michael Chorny¹
¹The Children's Hospital of Philadelphia, Philadelphia, PA

**Th-495**
Aptamer-Amphiphile Micelles Targeting a Novel Chemokine For Cancer Therapeutics
Michael Harris¹, Timothy Pearce¹, Thomas Pengo¹, and Efrosini Kokkoli²
¹University of Minnesota-Twin Cities, Minneapolis, MN
Th-496 Platelet Microparticle-inspired Nanomedicine (PMIN) for Targeted Thrombolysis
Michael Sun¹, Wei Li², Christa Palowski³, Clarissa Kos¹, Kavya Ravichandran², Gurbanvi Kaur³, and Anirban Sen Gupta²
¹Case Western Reserve University, Cleveland, OH, ²Cleveland Clinic, Cleveland, OH, ³Hathaway Brown School, Shaker Heights, OH

Th-497 Reversal of Elastin Calcification and Aneurysm in a Rat Model using Dual Targeted Therapy with EDTA- and PGG-loaded Nanoparticles
Nasim Nosoudi¹, Anika Chowdhury¹, Steven Siclari¹, Saketh Karamched¹, Vaidesh Parasaram¹, Joe Parrish¹, and Narendra Vyawahare¹
¹Clemson University, Clemson, SC

Th-498 Optimal Nanoparticle Uptake by Cells is Dictated by Morphology
Pouria Fattahi¹, Yin-Ting Yeh¹, Siyang Zheng¹, Sulin Zhang¹, Justin L. Brown¹, and Peter J. Butler¹
¹Pennsylvania State University, University Park, PA

Th-499 Magnetically Activated Hydrogels for the Delivery of Optimized Chemotherapeutic Temporal Profiles
Tania Emi¹, Tanner Barnes¹, Anita Tolouei¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Th-500 Magnetically Responsive Hydrogels for Directing the Sprouting and Maturation of Vasculature
Tania Emi¹ and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Th-501 Enhanced Cancer Immunotherapy by Microneedle Patch-Assisted Delivery of Anti-PD1 Antibody
Yanqi Ye¹, Chao Wang¹, Gabrielle Hochu¹, Hasan Sadeghfar¹, and Zhen Gu¹
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC

Th-502 Co-encapsulation of Insulin-Secreting Cells and Mesenchymal Stem Cells for Chronic Wound Closure
Ayeshia Aljaz¹, Matthew Teryek¹, and Ronke Olabisi¹
¹University of Rhode Island, Kingston, RI

Th-503 Red Blood Cell-Mediated Delivery of Lysozyme Dextran Nanogels to Pulmonary Vasculature
Daniel Pan¹, Jacob Brenner¹, Jacob Myerson¹, and Vladimir Muzykantov¹
¹University of Pennsylvania, Philadelphia, PA

Th-504 A Targeted Drug Delivery System for Selective Deliver of Insulin-like Growth Factor-1 to Infarcted Myocardium to Improve Stem Cell Survival
Ji Zhou¹, Michaela Rizzo³, Yuan Tang³, Andrew Issekutz³, Mohammad Khan³, and Bin Wang³
³Drexel University, CHESTER, PA, ¹Temple University, Philadelphia, PA, ²Dalhousie University, Halifax, NS, Canada

Th-505 Enhancing CD1-restricted T Cell Vaccination with Multi-adjuvant-loaded Nanomaterials
Dina Kats¹, Shaobin Shang², Chyung-Ru Wang², and Evan Scott¹
¹Northwestern University, Evanston, IL, ²Northwestern University, Chicago, IL

Th-506 Nano-polymersomes Facilitate Enzyme Replacement Therapy Efficacy to the Brain
Jessica Kelly¹,²,³, Douglas Martin²,³, and Mark Byrne¹,²,³
¹Biomimetic & Biohybrid Materials, Biomedical Devices, and Drug Delivery Laboratories, Department of Chemical Engineering, Auburn University, Auburn, AL, ²Scott-Ritchey Research Center, College of Veterinary Medicine, Auburn University, Auburn, AL, ³US Dept of Education GAANN Graduate Fellowship Program in Biological & Pharmaceutical Engineering, Auburn University, Auburn, AL

Th-507 Dual Loading of Hydrophilic and Hydrophobic Molecules into Polymersomes via Flash Nanoprecipitation
Sean Allen¹, Omar Osorio¹, and Evan Scott¹
¹Northwestern University, Evanston, IL

Track: Nano and Micro Technologies

Bioinspired Micro/Nano Devices

Th-508 Mechanical Stimulation and Stiffness Characterization Device for Electrospun Cell Culture Scaffolds
Soliman Alhudaithy¹, Devina Jaiswal¹, Namdev Shelke², Sangamesh G. Kumbar², and Kazunori Hoshino¹
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health Center, Farmington, CT

Th-509 Microfluidic Transcellular Monitoring of Cell-Nanomaterial Interaction For Translational Nanomedicine
Yoshitaka Sei¹, Erisa Sula¹, and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

Tracks: Nano and Micro Technologies, Translational Biomedical Engineering

Micro/Nano Tools in Global Health

Th-510 Investigation into Nonspecific Fluorescence Recovery in a FRET-Based Aptasensor
Alisha Geldert¹, Kenry¹, and Chwee Teck Lim¹
¹National University of Singapore, Singapore, Singapore

Th-511 Inducing Tissue Plasticity and Repair via Nanochannel-mediated Gene Delivery
Daniel Gallego-Perez¹, Durba Pal¹, Subhadip Ghatak¹, Natalia Higuta Castro¹, Shomita Mathew¹, Surya Gnyawali¹, Lingqian Chang¹, Wu Lu¹, Jose Otero¹, L. James Lee¹, and Chandan Sen¹
¹The Ohio State University, Columbus, OH

Th-512 Magnetic Removal of Free Hemoglobin: A Method to Reduce Hemolysis-Induced Platelet Activation
Kelli Simms¹, Nadeem Wajih³, Daniel Kim-Shapiro², and Elaheh Rahbar¹
¹Wake Forest School of Medicine, Winston Salem, NC, ²Wake Forest University, Winston Salem, NC
Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 2:30 pm–3:15 pm

**Th-513**
Computational Integration of Nano-scale Physical Biomarkers and Cognitive Assessments for Diagnosis and Prediction of Alzheimer's Disease
Tao Yue1, Xinghua Jia1, Jennifer Petrosino2, Dong Wang3, Zhen Fan1,3, Leming Sun1,3, Jesse Fine1, Rebecca Davis1, Scott Galster2, Jeff Kuret3, Douglas Scharre1, and Mingjun Zhang1
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Department of Biomedical Sciences, The Ohio State University, Columbus, OH, 3Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH,

**Th-514**
Nonparticle Assay for Detection of a Preeclampsia Biomarker using Surface Enhanced Raman Spectroscopy
Monika Schechingr1, Haley Marks1, Mahua Choudhury1, and Gerard Cote1,2
1Texas A&M, College Station, TX, 2Texas A&M Engineering Experiment Station, College Station, TX

**Th-515**
Simulation of Magnetic Particle Capture for Extracorporeal Magnetic Separation of Inflammatory Cytokines for Cardiopulmonary Bypass (CPB) procedures
Olivia Lanier1, Camilo Velez1, and Jon Dobson1
1University of Florida, Gainesville, FL

**Th-516**
Time-Domain Encoded Optofluidics for Multiplexed, Lock-in Detection of Fluorescent Signals
Venkata Yelleswarapu1 and David Issadore1
1University of Pennsylvania, Philadelphia, PA

**Th-517**
Magnetic Particle Capture as a Surrogate Measure for Synovial Fluid Viscosity
Yash Shah1, Lorena Maldonado-Camargo1, Neal Patel1, Elena Yarmola1, Carlos Rinaldi1, Jon Dobson1, and Kyle Allen1
1University of Florida, Gainesville, FL

**Th-518**
Instrument-free Assay for Monitoring Bladder Cancer with High Specificity and Sensitivity in Resource Poor Settings
Abhinav Acharya1, Andres Correa1, Tatum Tarin1, and Steven Little1
1University of Pittsburgh, Pittsburgh, PA

**Th-519**
A Smartphone-Enabled Portable Diagnostics for Iron Deficiency in Resource-Limited Settings
Balaji Srinivasan1, Seoho Lee1, Dakota O’Dell1, David Erickson1, and Saurabh Mehta1
1Cornell University, Ithaca, NY

**Th-520**
Biomimetic Nanotopography to Control Cell Adhesion on an Artificial Cornea
Elena Liang1, Mary Nora Dickson1, Cristina Kenney1, Marjan Farid1, Roger Steinert1, and Albert Yee1
1University of California, Irvine, Irvine, CA

**Th-521**
Tunable Wax-ink Valves for Multistep Paper-fluidic Diagnostics
Elizabeth Phillips1, Tori Clift1, and Jacqueline Linnes1
1Purdue University, West Lafayette, IN

**Th-522**
Breaking the Diagnostic Barrier: Paper-Based Assay for Simplified Sickle Cell Diagnosis
Kevin Cyr1, Christina Marasco1, and Jennifer Colby2
1Vanderbilt Institute for Integrative Biosystems Research and Education, Nashville, TN, 2Vanderbilt University Medical Center, Nashville, TN

**Th-523**
Modeling the Early Stages of Fatty Liver Disease and Fibrosis in Microengineered Human Liver Cultures
Matthew Davidson1 and Salman Khetani1,2
1Colorado State University, Fort Collins, CO, 2University of Illinois at Chicago, Chicago, IL

**Th-524**
Detection Signal Amplification based on Cyclic Catch-and-Release
Michael Jacobs1 and Frederick Haselton1
1Vanderbilt University, Nashville, TN

**Th-525**
Paper-Based Test for Indirect Screening of Newborns for Sickle Cell Disease
Nathaniel Piety1, Alex George2, Sonia Serrano2, Maria Lanzil2, Palika Patel2, Maria Notli2, Silvina Kahn2, Damian Nirenberg2, João Camanda3, Gladstone Airewele4, and Sergey Shevkoplyas1
1University of Houston, Houston, TX, 2Baylor College of Medicine, Houston, TX, 3Angola Sickle Cell Initiative, Cabinda City, Angola

**Track: Nano and Micro Technologies Advances in Micro/Nano Manufacturing**

**Th-526**
Elongation Processing to Enhance Macromolecular Orientation and Strength of Electros spun Nanofibers
David Brennen1, Dave Jao1, Xiao Hu1, and Vince Beachley1
1Rowan University, Glassboro, NJ

**Th-527**
Effects of Solvent and Process Parameters on the Structures and Functions of Micellar Nanocrystals
Gang Ruan1, Yuxiang Sun1, Xinyi Ding1, Ning Han1, Jun Wang1, and Xiaoya Yu1
1Nanjing University, China, Nanjing City, China, People’s Republic of China

**Th-528**
Control of Shape and Optical Property of Anisotropic Gold Nanomaterials by the Reduction of Silver Ion
Hyon Bin Na1, Bong-Geun Kim1, Jong-Won Lee1, and Dujin Kim1
1Myongji University, Yongin, Korea, Republic of Korea

**Th-529**
Graphene Quantum Dots: An Alternative Filler to Nanocomposite And Their Biomedical Applications.
Naveen Gobi1, Darshan Vijayakumar1, Chaitra Ramesh1, Shambhavi Kashyap1, and Palarin Erogbogbo1
1Texas A&M University, Houghton, MI

**Th-530**
Dependence of Nanotextured Titanium Orthopedic Surfaces on Electrolyte Fluoride Concentration
Radheshyam Tewari1, Sachin Bhosle2,3, and Craig Friedrich1
1Michigan Technological University, Houghton, MI, 2Michigan Technological University, Houghton, MI, 3Michigan Technological University, Houghton, MI

**Th-531**
Three-Dimensional Microfabrication of Biodegradable Polymers for Biomedical Applications
Thanh Nguyen4
1University of Connecticut, Storrs, CT
Track: Nano and Micro Technologies
Micro/Nano Tools in Infectious Diseases

Th-532
Mycobacterium smegmatis Biofilm Response to Time-Varying and Nanoparticle Encapsulated Antibiotic Concentrations in a Microfluidic Device
Loc Truong¹, Norman Bae², Allen Wang¹, and Benjamin Hawkins¹
¹San Jose State University, San Jose, CA

Th-533
Measurement of C-Reactive Protein Using CdSe/ZnS Quantum Dots Through Its Spectral Intensity Values
Kalpana Ramakrishnan¹ and Shahnila Raza¹
¹Rajalakshmi Engineering College, Chennai, India

Th-534
Hollow Silica Microspheres for Buoyancy-assisted Bioseparation
Lichen Xiang¹, Erica Osta¹, Lining Li², Gabriel López²,³, and Shannon Weigum¹
¹Texas State University, San Marcos, TX, ²Duke University, Durham, NC, ³University of New Mexico, Albuquerque, NM

Th-535
Structural Antibacterial Properties of Carbon-Infiltrated Carbon Nanotube Coatings
Stephanie Morco¹, Anton Bowden¹, Brian Jensen¹, and Dustin Williams²
¹Brigham Young University, Provo, UT, ²University of Utah, Salt Lake City, UT

Tracks: Nano and Micro Technologies, Cellular and Molecular Bioengineering Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)

Th-536
Rare Biomarker Quantification Through Integrated Dielectrophoretic and Plasmonic Based Fluorescence Enhancement
Logeeshan Velamankam¹, Michael Fondakowski¹, Ivan Lima¹, and Dharmakeerthi Nawarathna¹
¹North Dakota State University, Fargo, ND

Th-537
Determining the Size of Biomolecule-Tagged Nanoparticles by Brownian Motion Quantification
Katherine Clayton¹, Janelle Salameh¹, Julia Fraser¹, Neldia Vazquez-Portalatin¹, Alyssa Panitch¹, Steven Wereley¹, and Tamara Kinzer-Ursem¹
¹Purdue University, West Lafayette, IN

Th-538
Femtoliter Droplet Confinement of Pneumococcus Pairs for Single Event Transformation Assay
Martin Brennan¹, Donald Morrison¹, and David Eddington¹
¹University of Illinois at Chicago, Chicago, IL

Th-539
Ultrasonic Microfluidic Assay for Genome-wide DNA methylation Analysis and Precision Medicine
Sai Mal¹, Zhixiong Sun¹, Hehuang Xie¹, Chen Sun¹, Travis Murphy¹, and Chang Lu¹
¹Virginia Tech, Blacksburg, VA

Th-540
Development of a Microfluidic Device for Trapping, Transforming, and Monitoring Gene Expression of Individual Tobacco Protoplasts
Tayler Schimel¹, Mary-Anne Nguyen¹, Stephen Sarles¹, and Scott Lenaghan¹
¹University of Tennessee, Knoxville, TN

Track: Respiratory Bioengineering
Computational Modeling of the Respiratory System in Health and Disease

Th-541
Quantitative Yeast Cell Dynamics in Static Chemical Gradients
Thanh Vo¹, Phi Pham¹, John S. Choy¹, and Xiaolong Luo¹
¹Catholic University of America, Washington, DC

Th-542
Ingested Nanoparticles Alter Gastrointestinal Tract Enzyme Function and Mineral Absorption
Zhongyuan Guo¹, Nicole Martucci¹, Gabriella Shull¹, Elad Tako¹, and Gretchen Mahler¹
¹Binghamton University, Binghamton, NY, ²U.S. Department of Agriculture, Ithaca, NY

Th-543
Multi-scale Modeling Of Parenchymal/ Airways Interactions
Jason Ryan¹, Hideki Fujoka¹, David Halpern², and Donald Gaver³
¹Tulane University, New Orleans, LA, ²University of Alabama, Tuscaloosa, AL

Th-544
Evaluating Videoendoscopic Observations into Computational Models of Eustachian Tube Function
Justo Torres-Rodriguez¹ and Samir Ghadiali¹
¹The Ohio State University, Columbus, OH

Th-545
Relationship Between CT-based Lung Mechanics and BODE index in COPD
Sanddeep Boddu¹, Surya Bhattacharya², Sarah Gerard³, John Newell Jr.¹, Mark Dransfield², Eric Hoffman¹, and Joseph Reinhardt¹
¹The University of Iowa, Iowa City, IA, ²The University of Alabama, Birmingham, AL

Th-546
Integrated Model of Lung Mitochondrial Tricarboxylic Acid Cycle and Electron Transport System
Xiao Zhang¹, Ranjan Dash¹, Venkat Pannala², Anne Clough³, Amadou Camara³, Elizabeth Jacobs³, and Said Audi³
¹Marquette University, Milwaukee, WI, ²Medical College of Wisconsin, Milwaukee, WI, ³Zablocki VA Medical Center, Milwaukee, WI

Track: Respiratory Bioengineering
Mechanics and Mechano-biology of the Lung and Airways

Th-547
Incorporating Macrophages into An In-vitro Model of Mechanically-Induced Lung Inflammation
Christopher Bobba¹ and Samir Ghadiali¹
¹The Ohio State University, Columbus, OH

Th-548
Influence of Substrate Stiffness on Fibrogenic Response of Fibroblasts to Carbon nanotubes
Kai Wang¹, Lin Shi¹, and Yong Yang¹
¹West Virginia University, Morgantown, WV

Th-549
Modulating Mechano-Transduction and Middle Ear Inflammation using miR-146a
Natalia Higuera-Castro¹, Vasudha Shukla¹, J. Douglas Swarts², and Samir N. Ghadiali¹
¹The Ohio State University, Columbus, OH, ²University of Pittsburgh, Pittsburgh, PA
Track: Respiratory Bioengineering

Pulmonary Cell and Matrix Biology

**Th-550**
Differentiation of Lung Fibroblasts to Airway Smooth Muscle (ASM): Towards a Tractable In Vitro Model
Joshua Morgan¹, Peter Sariano², and Jason Gleghorn¹
¹University of Delaware, Newark, DE

**Th-551**
Identification of Ventilation Type During Anesthesia Period in Operating Rooms
Ali Jalali¹, Luis Ahumada¹, Jorge Galvez¹, and Mohamed Rehman¹
¹Children's Hospital of Philadelphia, Philadelphia, PA

**Th-552**
Non-Invasive, Real-time, Affordable Monitoring of Hemoglobin and Vital parameters for ICU patients
Harsh Modi¹, David Weldon¹, and Mehmet Kaya¹
¹Florida Institute of Technology, Melbourne, FL

**Th-553**
Study on CO2 Rebreathing Device for Sleep Apnea Treatment by Means of CFD Analysis and Experiment
Mehdi Shokoueinejad¹, Arman Pazouki¹, Jake Levin¹, Fa Wang¹,
Chris R. Fernandez³, Samuel J. Rusk², and John G. Webster⁴
¹University of Wisconsin-Madison, Madison, WI,
²California State University, Los Angeles, CA,
³EnsoData, Inc., Madison, WI,
⁴UW-Madison, Madison, WI

**Th-554**
Design and Implementation of a Sensitive Sensor for the Measurement of Flow in Mice
Samer Bou Jawde¹, Bradford Smith², Jason Bates², and Bela Suki¹
¹Boston University, Boston, MA,
²University of Vermont, Burlington, VT

Track: Drug Delivery

Drug Delivery in Tissue Engineering

**Th-555**
Controlled Release of Bone Morphogenetic Protein-2 from Thiol-Ene Click Hydrogels
Faraz Jivan¹, Ken Muneeoka¹, and Daniel Alge¹
¹Texas A&M University, College Station, TX

**Th-556**
Control Release Anesthetics to Enable An Integrated Anesthetic-MSC Therapeutic
Timothy Maguire¹, Mollie Davis¹, Ileana Marrero-Berríos²,
Charles Zhu¹, Chris Gaughan¹, Jonathan Weinberg¹,
Reve Schloss⁴, and Joel Yarmush³
¹Beau Ridge Pharmaceuticals, New York, NY,
²New York Methodist Hospital, Brooklyn, NY,
³New York University, New York, NY,
⁴Technical University Munich, Munich, Germany

**Th-557**
Highly Efficient Encapsulation of Small-molecule N-acetylcysteine Within PLGA Nanoparticles
Nicholas Murphy¹ and Kyle Lampe¹
¹University of Virginia, Charlottesville, VA

**Th-558**
An Intestinal Trojan Horse as Regenerative Therapy for Inflammatory Bowel Disease
Zahrá Davoudi¹ and Qun Wang¹
¹Iowa State University, Ames, IA

Track: Respiratory Bioengineering

**Th-559**
Lutein Surfactant Coatings Improve Nanoparticle Uptake and Retention in Lung Epithelial Cells
Roshni Iyer¹, Cancan Xu¹, Yi Hong¹,², Connie Haia²,³, and
Kytaï Nguyen¹,²
¹The University of Texas at Arlington, Arlington, TX,
²Joint Graduate Program in Biomedical Engineering–University of Texas at Arlington
and University of Texas Southwestern Medical Center, Arlington, TX,
³University of Texas Southwestern Medical Center, Dallas, TX

**Th-560**
Modeling Transdermal Drug Delivery Via Diffusion Through a Porous, Thin-Walled Suture
Stephanie Jorgensen¹, Pedro Arce¹, and Jonathan Sanders¹
¹Tennessee Technological University, Cookeville, TN

**Th-561**
Micro-CT Based Imaging of Metallic Nanoparticles for Tracking Microspheres following Intra-articular Drug Delivery
Taylor Comte¹, Daniel Leib¹, Nathan Reed¹, Elizabeth Leimer¹,²,³, Matthew Silva¹, and Lori Setton¹
¹Washington University in St. Louis, St. Louis, MO,
²Duke University, Durham, NC,
³Albany Medical College, Albany, NY

**Th-562**
Control-released Basic Fibroblast Growth Factor in Photocrosslinkable Scaffold Promotes Vascularized Skin Tissue Regeneration Using Human Umbilical Cord-derived Mesenchymal Stem Cells
Xiao-Fei Zhang¹ and Xiaofeng Cui¹,²,³
¹Wuhan University of Technology, Wuhan, China,
²Stemorgan Therapeutics, Albany, NY,
³Rensselaer Polytechnic Institute, Troy, NY,
⁴Technische Universität München, Munich, Germany

**Th-563**
VEGF-PLGA Nanoparticles Promote Vascularization In Vitro and In Vivo
Yasin Oduk¹, Ramaswamy Kannappan¹, Wuqiang Zhu¹, and
Jianyi Zhang¹
¹University of Alabama at Birmingham, Birmingham, AL

**Th-564**
Dual Delivery of TGF-β Receptor II Binding Peptide and Oxygen to Control Cardiac Fibrosis
Zhaobo Fan¹, Minghuan Fu¹, and Jianjun Guan¹
¹Ohio State University, Columbus, OH

**Th-565**
Generation of Dissolved Oxygen Concentration Gradient Inside of Microfluidic Chip without Additional Gas Supplies or Chemicals
Heeyeong Jang¹ and Sang-Hoon Lee¹
¹Korea University, Seoul, Korea,
²Korea University, Republic of
³Korea University, KU-KIST graduate school, Seoul, Korea,
⁴Technical University Munich, Munich, Germany

**Th-566**
Experimental and Computational Models of Mass Transport Within 3D Collagen-Matrigel Hydrogels
Lauren Marshall¹, Roy Koomulli¹, Andra Frost¹, and Joel Berry¹
¹University of Alabama at Birmingham, Birmingham, AL

**Th-567**
Bioreactor Design for Tissue Engineered Cornea
Patrick Scalise¹, Chris Kotcherha¹, and Elizabeth Orwin¹
¹Harvey Mudd College, Claremont, CA
Track: Tissue Engineering
Clinical Translation of Engineered Tissues

Th-569
Non-invasive Assessments to Track Human White Adipose Tissue Engineered Models In Vitro
Rosalyn Abbott1, Carlo Alonzo1, Francis Borowsky1, Irene Georgakoudi1, and David Kaplan1
1Tufts University, Medford, MA

Th-570
Negative Pressure Enhances Cellular Infiltration into Electrospun Fibrous Scaffolds
Azadeh Timnak1,2, Jonathan A. Gerstenhaber1,2, Yah-el Har-el1,2, and Peter I. Lelkes1,2
1Department of Bioengineering, College of Engineering, Temple University, Philadelphia, PA; 2Temple Institute for Regenerative Medicine and Engineering (TIME), Temple University, Philadelphia, PA

Th-571
The Effects of Hypoxy Cell Expansion and Tissue Culture on Auricular Cartilage Engineering
Benjamin Cohen1 and Lawrence Bonassar1
1Cornell University, Ithaca, NY

Th-572
Blow-spun Chitosan/PEG/PLGA Nanofibers as a Novel Tissue Engineering Scaffold
Diane Bienek1 and Wojtek Tutak1
1ADA Foundation, Gaithersburg, MD

Th-573
Contributions of BMP Proteins in Cardiac Repair Cell functionality and Angiogenesis in a 3D in vitro Model
Isabella Pialotta1, Bruce Sun1, Gregory Lallos1, Cecile Terreno1, and Donald Freytes1,2,3
1The New York Stem Cell Foundation Research Institute, New York, NY; 2North Carolina State University, Raleigh, NC; 3University of North Carolina-Chapel Hill, Chapel Hill, NC

Th-574
Development of a Bio-inspired Hybrid Nanosack for Islet Transplantation in the Omentum
Patrick Hwang1, Dong-Jin Lim1, Grant Alexander1, Anath Shalev1, Wanxing Cui1, Shawn Gilbert1, and Ho-Wook Jun1
1University of Alabama at Birmingham, Birmingham, AL; 2Medstar Georgetown Hospital, Washington, DC

Th-575
Tissue Engineered Cartilaginous Trachea Using Chondrocyte-Seeded Polymer Scaffolds
Timothy Holzberg1, Ting Guo1, Joshua Bedwell1, Diego Preciado1, George Zalaz2, and John Fisher1
1University of Maryland, College Park, MD; 2Children’s National Medical Center, Washington, DC

Track: Tissue Engineering
Engineering Replacement Tissues

Th-576
A Soft Microfluidic Device as an In Vitro Model for Studying Mechanobiology of Tubular Organs
Hyeonji Yu1, Dongwon Kang2, Kwangin Shin1, Minji Whang1, and Jungwook Kim1
1Sogang University, Seoul, Korea, Republic of

Th-577
Cell-Matrix and Cell-Cell Interactions in Endothelial Barrier Models on Porous Glass Membranes
Stephanie Casillo1, Ana Peredo1, Andrea Mazzocchi1, and Thomas Gaboriski1
1Rochester Institute of Technology, Rochester, NY

Th-578
Novel Mechanisms of Non-Coding Genomic Regulation Identified in Cardiac Disease-in-a-dish Models
Aditya Kumar1, Stephanie Thomas2, Kirsten Wong3, Kevin Tenerelli1, Valentina Lo Sardo4, William Ferguson5, Eric Topol3,4, Kristin Baldwin2, and Adam Engler1,6
1University of California, San Diego, La Jolla, CA; 2The Scripps Research Institute, San Diego, CA; 3Scripps Translational Science Institute, La Jolla, CA; 4Sanford Consortium for Regenerative Medicine, San Diego, CA

Th-579
Co-patterning of Living Tissues In 3D-Printed Microfluidic Chips
Christian Nguyen1, Stephanie Knowlton2, Chu Hsiang Yu2, and Savas Tasoglu2
1University of Connecticut, Danbury, CT; 2University of Connecticut, Storrs, CT

Th-580
Human Colon Biopsy Slices Ex Vivo: Impacts of Oxygen and Bacteria
Luke Schwertfeger1, Erica Borresen1, Elizabeth Ryan1, and Stuart Tobet1
1Colorado State University, Fort Collins, CO

Th-581
Effect of Gelatin Patterning and Stiffness on the Culture of Podocytes for Glomerulus-on-a-chip
Ellery Jones1, Matthew Ishaahk2, Allia Mitrofanova2, Alessia Fornoni3, and Ashutosh Agarwal1
1University of Miami, Coral Gables, FL; 2University of Miami, Miami, FL

Th-582
Endogenous Signals Shape Phenotype of Primary Hepatoocytes Cultured in Microchambers
Pantea Gheibi1, Amranul Haque1, Yandong Gao1, Elena Foster1, Kyung Jin Son1, Jungmok You1, Gulinaz Stibayeva1, Dipali Patel1, and Alexander Revzin1
1University of California, Davis, CA; 2University of Notre Dame, Notre Dame, IN

Th-583
A Tissue Engineered Model of Aging
Aylin Acun1, Dervis Vural1, and Pinar Zorlutuna1
1University of Notre Dame, Notre Dame, IN

Th-584
Design and Development Of An In Vitro Vascular Model Using 3D Printing-enabled Hydrogel Casting Technique
Pranav Soman1, Liang Yang1, Shivkumar Shridhar1, and Melissa Gerwitz1
1Syracuse University, Syracuse, NY

Th-585
Vessel Growth Response to Controlled Oxygen Gradients in a Microfluidic Platform
Sandra Lamp1, Yunli Chu1, Alan Soetikno1, and Steven George1
1Washington University in St. Louis, St. Louis, MO
**Track: Tissue Engineering**

**Engineering Tissue Interfaces**

**Th-586**

Nanostructuring to Improve Osseointegration of Titanium Implants in Spinal Reconstruction

Alethia Barnwell¹, Sandra Arias¹, Akshath Shetty¹, and Jean Paul Allain¹

¹University of Illinois Urbana-Champaign, Urbana, IL

**Th-587**

Fabrication and Characterization of Poly(-amino ester) Hydrogel Microspheres with Tailorable Size and Properties

Amir Najjarzadeh¹,² and David Puleo²

¹University of Kentucky, Lexington, KY, ²University of Kentucky, Lexington, KY

**Th-588**

Exploring Synergy Between Mechanical and Bioinstructive Cues for the Tendon: Bone Interface

Brittany Banik¹ and Justin Brown¹

¹The Pennsylvania State University, University Park, PA

**Th-589**

Nanotopography-Induced Neuromuscular Junction Assembly

Eunkyung Ko¹, Seung-Jung YU², Jooyeon Park¹, Sung Gap Im³, Marni Boppart¹, Rashid Bashir¹, and Hyunjoon Kong¹

¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of

**Th-590**

Optimizing The Growth and Characterization of Retinal Pigment Epithelial Cells

Ian Wadsworth¹, Harshit Singh¹, Lori Caldwell¹,²,³, Zach Jensen¹, Bret Hansen¹, Randy Lewis¹, and Elizabeth Vargis¹

¹Utah State University, Logan, UT

**Th-591**

Biomimetic Surface Modification of PLLA Scaffolds for Bone Tissue Engineering

Cortes Williams¹, Nathan R. Richbourg¹, Ariel Chloe Cross¹, and Vassilios Sikavitsas¹

¹University of Oklahoma, Norman, OK

**Th-592**

Biocompatibility of Plasma Immersion Ion Implantation Surface Treated Shape Memory Polymer

Xinying Cheng¹, Alexey Kondyurin², Marcela M.M. Bilek², Shisan Bao³,⁴,⁵, and Lin Ye¹

¹Centre for Advanced Materials Technology, School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney, NSW²006, Australia, ²Applied and Plasma Physics, School of Physics, the University of Sydney, NSW²006, Australia, ³Discipline of Pathology and School of Medical Science, University of Sydney, NSW²006, Australia, ⁴Boch Institute, the University of Sydney, NSW²006, Australia, ⁵Charles Perkins Centre, the University of Sydney, NSW²006, Australia

**Track: Tissue Engineering**

**Naturally-Derived and Extracellular Matrix Biomaterials in Tissue Engineering**

**Th-593**

Increasing Modulus of Perfusion-Decellularized Kidney Organ Scaffolds to Enhance Recellularization

Alexey Goloubev¹, Andres Rubiano¹, Alicia Brown¹, Edward Ross¹, Chelsey Simmons², and Bradley Willenberg¹

¹University of Central Florida College of Medicine, Orlando, FL, ²University of Florida, Gainesville, FL

**Th-594**

Fiber-Embedded Scaffolds for Tricuspid Heart Valve Tissue Engineering

Alison Jacob¹, Ayesha Khanam², and Howard Matthew¹

¹Wayne State University, Detroit, MI, ²University of Michigan, Ann Arbor, MI

**Th-595**

Mechanical Bioeffects Contribute to Ultrasound-Induced Pro-Migratory Collagen Activity

Emma Grygotsis¹, Diane Dalecki¹, and Denise Hocking¹

¹University of Rochester, Rochester, NY

**Th-596**

Considerations for Using The Resazurin Reduction Assay For Temporal Quantification of Cell Number In Tissue Engineering and Three-Dimensional Perfusion Culture Applications

Joseph UzarSKI¹, Michael DiVito¹, William Miller¹, and Jason Wertheim¹,²,³,⁴

¹Northwestern University Feinberg School of Medicine, Chicago, IL, ²Northwestern University, Evanston, IL, ³Jesse Brown VA Medical Center, Chicago, IL, ⁴Northwestern University, Chicago, IL

**Th-597**

Crosslinking of the Human Amniotic Membrane using Riboflavin and UVA

Julien Arnabala² and Matthias Nollett¹

¹University of Oklahoma, Norman, OK

**Th-598**

Perlecan Domain I Gradients Establish Growth Factor Gradients in Hydrogels for Salivary Engineering

Kelsea M. Hubka¹, Brian J. Grindel², Swati Pradhan-Bhatt³, Robert L. Witt³,⁴, Daniel D. Carson¹, Daniel A. Harrington¹, and Mary C. Farach-Carson¹

¹Rice University, Houston, TX, ²Helen F. Graham Cancer Center & Research Institute, Christiana Care, Newark, DE, ³University of Delaware, Newark, DE, ⁴Thomas Jefferson University, Philadelphia, PA

**Th-599**

Chemical and Topographical Cues for Modulating Macrophage Activation States

Melissa Wrobel¹ and Harini Sundararaghavan¹

¹Wayne State University, Detroit, MI

**Track: Tissue Engineering**

**Stem Cells in Tissue Engineering**

**Th-600**

Assessment of Thrombogenicity of Human Adipose-derived Stem Cells

Anh La¹ and Robert Tranquillo¹

¹University of Minnesota, Minneapolis, MN

**Th-601**

Mechanical Stimulation Increases RNA-level Expression of Knee Meniscus Genes in Adipose-derived Stromal Cells

Elizabeth Meier¹, Bin Wu¹, Aamir Siddiqui², Donna Tepper²,³, Michael Longaker³, and Mai Lam¹,³

¹Wayne State University, Detroit, MI, ²Stanford University, Stanford, CA, ³Jesse Brown VA Medical Center, Chicago, IL

**Th-602**

Biodegradable Porous Microspheres as a Stem Cell Vehicle and Controlled Drug Delivery Platform

Eric Sandhurst¹ and Hongli Sun¹

¹University of South Dakota, Sioux Falls, SD

**Th-603**

The Effect of Electro-active PEGDA Hydrogels on Mesenchymal Stem Cells

Krish Gupta¹

¹Rutgers University, Kendall Park, NJ
Th-604
Utah-Mesenchymal Stem Cell Sheet Technology for the Advancement of Stem Cell Transplantation Therapy
Sophia Bou-Ghannam¹
¹University of Utah, Salt Lake City, UT

Th-605
NR2F2 Regulates Chondrogenesis of Human Mesenchymal Stem Cells in Bioprinted Cartilage
Guifang Gao¹, Xiao-Fei Zhang¹, Karen Hubbell³, Guohao Dai¹, Arndt Schilling⁴, Tomo Yonezawa⁵, and Xiaofeng Cui¹,²,³
¹Wuhan University of Technology, Wuhan, China, People’s Republic of, ²Stemorgan Therapeutics, Albany, NY, ³Rensselaer Polytechnic Institute, Troy, NY, ⁴Technical University Munich, Munich, Germany, ⁵Nagasaki University, Nagasaki, Japan

Th-606
Wnt-YAP Interactions during Neural Tissue Patterning of Human Induced Pluripotent Stem Cells
Julie Bejoy¹, Liqing Song¹, and Yan Li¹
¹Florida State University, Tallahassee, FL

Track: Tissue Engineering
Tissue Engineering

Th-607
Developing Primers for Multiplexed PCR of Human Neural Progenitor Cells
Alena Casella¹ and Rebecca Kuntz Willits¹
¹The University of Akron, Akron, OH

Th-608
Fabrication of Electrospun Branched-Clusters as Fundamental Building Units for Tissue Engineering
Ben Minden-Birkenmaier¹, Gretchen Selders¹, and Gary Bowlin¹
¹University of Memphis, Memphis, TN

Th-609
The Effects and Mechanisms of Electromagnetic Stimuli on Cultured Rabbit Corneal Fibroblasts
Deval Gupta¹ and Nathan Miller¹
¹Harvey Mudd College, Claremont, CA

Th-610
Reproducible Construction of Honeycomb Concave Microwell Arrays for 3D Microtissues Engineering
Geonhui Lee¹, JaeSeo Lee², and SangHoon Lee²
¹Korea University, Seoul, Korea, Republic of, ²Korea University, Seoul, Korea, Republic of

Th-611
Electrospinning Collagen and Gelatin Fibers To Model The Extracellular Matrix Of The Corneal Stroma
Cesar Orellana¹ and Kelly McConnell¹,²
¹Harvey Mudd College, Claremont, CA

Th-612
A Bioinspired Culture Medium Prolongs the Functional Lifetime of Human Liver Cells in Culture
Matthew Davidson¹ and Salman Khetani¹,²
¹Colorado State University, Fort Collins, CO, ²University of Illinois at Chicago, Chicago, IL

Th-613
Resveratrol Releasing Scaffolds to Promote Lipid Metabolism in Adipose Tissue
Michael Hendley¹ and Michael Gower¹
¹University of South Carolina, Columbia, SC

Th-614
Mimicking the Bone Microenvironment to Study Cellular Activity on a Calcium Phosphate Scaffold
Karen Burg¹,² and Olsen Horton²
¹University of Georgia, Athens, GA, ²Clemson University, Clemson, SC

Th-615
Role of Extracellular Matrix and Electrospun Polymer Fiber Diameter on Mammalian Cell Guidance
Priyanka Ruparelia¹, Ramakrishna Sharma², Lifeng Zhang², Shyam Aravamudhan², and Dennis LaJeunesse¹
¹University of North Carolina at Greensboro, Greensboro, NC, ²North Carolina A&T State University, Greensboro, NC
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<tr>
<th>Time</th>
<th>Event</th>
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<td><strong>Platform Sessions–Fri–1</strong></td>
<td>Convention Center</td>
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<tr>
<td>8:00 am–9:30 am</td>
<td><strong>Meet the Expert: Collaborations for International Research</strong></td>
<td>Room 204</td>
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<tr>
<td>8:00 am–9:30 am</td>
<td><strong>Special Session: AAA-BMES Symposium: Genome Editing Strategies in Bioengineering</strong></td>
<td>Room 208AB</td>
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<td>8:00 am–9:00 am</td>
<td><strong>Industry Session: SBIR/STTR</strong></td>
<td>Room 201</td>
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<td>9:15 am–10:15 am</td>
<td><strong>Industry Session: Reimbursement</strong></td>
<td>Room 201</td>
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<tr>
<td>9:30 am–5:00 pm</td>
<td><strong>Exhibit Hall Open</strong></td>
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<td>9:30 am–5:00 pm</td>
<td><strong>Poster Session</strong></td>
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<td>9:30 am–10:15 am</td>
<td><strong>Poster Viewing with Authors &amp; Refreshment Break</strong></td>
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<td>10:15 am–11:45 am</td>
<td><strong>Plenary Session</strong></td>
<td>Auditorium</td>
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<td>12 noon–1:30 pm</td>
<td><strong>Industry Session: Healthcare Innovation with Physicians</strong></td>
<td>Room 201</td>
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<td>1:45 pm–3:15 pm</td>
<td><strong>Platform Sessions–Fri–2</strong></td>
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<tr>
<td>1:45 pm–3:15 pm</td>
<td><strong>Meet the Expert: Meet the Journal Editors</strong></td>
<td>Room 204</td>
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<tr>
<td>2:00 pm–3:00 pm</td>
<td><strong>Industry Session: Mobile/Digital Health</strong></td>
<td>Room 201</td>
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<tr>
<td>3:15 pm–4:00 pm</td>
<td><strong>Poster Viewing with Authors &amp; Refreshment Break</strong></td>
<td>Exhibit Hall</td>
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<tr>
<td>3:15 pm–5:15 pm</td>
<td><strong>Industry Session: Investment Pitches and Partnering</strong></td>
<td>Room 201</td>
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<tr>
<td>3:15 pm–6:15 pm</td>
<td><strong>Special Session: KOSOMBE-US-KOREA Joint Workshop on BME</strong></td>
<td>Room 208AB</td>
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<tr>
<td>4:00 pm–5:30 pm</td>
<td><strong>Platform Sessions–Fri–3</strong></td>
<td>Convention Center</td>
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<tr>
<td>4:00 pm–5:30 pm</td>
<td><strong>Meet the Expert: Collaborations with Industry</strong></td>
<td>Room 204</td>
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<tr>
<td>4:00 pm–5:30 pm</td>
<td><strong>Special Session: Educational Approaches to Best Prepare Students for Industry</strong></td>
<td>Room 208CD</td>
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<tr>
<td>5:45 pm–6:30 pm</td>
<td><strong>Special Plenary Session</strong></td>
<td>Auditorium</td>
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<tr>
<td>8:30 pm–11:00 pm</td>
<td><strong>BMES Dessert Bash</strong></td>
<td>Ballroom AB/CC</td>
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**FRIDAY’S HIGHLIGHTS**

- **Meet the Expert: Meet the Journal Editors**
  - 1:45 pm–3:15 pm
  - Room 204
  - See page 153
- **Industry Session: Mobile/Digital Health**
  - 2:00 pm–3:00 pm
  - Room 201
  - See page 153
- **Poster Viewing with Authors & Refreshment Break**
  - 3:15 pm–4:00 pm
  - Exhibit Hall
- **Industry Session: Investment Pitches and Partnering**
  - 3:15 pm–5:15 pm
  - Room 201
  - See page 153
- **Special Session: KOSOMBE-US-KOREA Joint Workshop on BME**
  - 3:15 pm–6:15 pm
  - Room 208AB
  - See page 153
- **Platform Sessions–Fri–3**
  - 4:00 pm–5:30 pm
  - Convention Center
  - See pages 154-162
- **Meet the Expert: Collaborations with Industry**
  - 4:00 pm–5:30 pm
  - Room 204
  - See page 162
- **Special Session: Educational Approaches to Best Prepare Students for Industry**
  - 4:00 pm–5:30 pm
  - Room 208CD
  - See page 162
- **Special Plenary Session**
  - 5:45 pm–6:30 pm
  - Auditorium
  - Extraordinary Challenges and the Need for Extraordinary Competencies–The Role of the Biomedical Engineer
  - Jim Gallarda
- **BMES Dessert Bash**
  - 8:30 pm–11:00 pm
  - Ballroom AB/CC
**Platform Session 1**

### OP-Fri-1-1  
**Auditorium 1**

**Tracks:** Cellular and Molecular Bioengineering, Biomechanics  
Testing, Modeling, and Exploiting Mechanobiology

**Chairs:** Christopher Lemmon, Guohao Dai

#### 8:00 am

**Mechanical Amplification of Tumor Death Using Polymeric Nanoparticles**  
Michael Mitchell¹ and Robert Langer¹  
¹MIT, Cambridge, MA

#### 8:15 am

**High Throughput Label-Free Cell Viability Assay Using Deformability Cytometry**  
Mahdokht Masaeli¹, Dewal Gupta², and Dino Di Carlo²  
¹Stanford University, Stanford, CA, ²UCLA, Los Angeles, CA

#### 8:30 am

**Combinatorial ECM Arrays Reveal the Effects of Biomechanics In Liver Progenitor Differentiation**  
Andreas Kourouklis¹, Kerim Kaylan², and Gregory Underhill²  
¹University of Illinois Urbana-Champaign, Urbana, IL, ²University of Illinois Urbana Champaign, Urbana, IL

#### 8:45 am

**To Be, or Not to Be: Cellular Homeostasis to Mechanical Perturbations**  
Shinuo Weng¹, Yue Shao¹, Weiqiang Chen¹,², and Jianping Fu¹  
¹University of Michigan-Ann Arbor, Ann Arbor, MI, ²New York University, New York, NY

#### 9:00 am

**Effects of Compaction and Stretch on Cell Alignment in 3D Constructs: Testing a Proposed Model**  
Kellen Chen¹ and Jeffrey W. Holmes¹  
¹University of Virginia, Charlottesville, VA

#### 9:15 am

**Modeling the Influence of Substrate Young’s Modulus, Adhesion Size, and Cell Geometry on Cell Traction**  
Ghadian Shamsan¹ and David Odde¹  
¹University of Minnesota Twin Cities, Minneapolis, MN

### OP-Fri-1-2  
**Auditorium 2**

**Tracks:** Cancer Technologies, Nano and Micro Technologies  
3D Microfluidic Cancer Models

**Chairs:** Ian Wong, Matt Kinsella

#### 8:00 am

**3D Printed Biomimetic Nanocomposite Matrix for the Study of Breast Cancer Bone Metastasis**  
Wei Zhu¹, Robert Glazer², and Lijie Grace Zhang¹  
¹The George Washington University, Washington, DC, ²Georgetown University Medical Center, Washington, DC

#### 8:15 am

**Micropalpation: Analysis of Cancer Spheroid Stiffness Using Microweepers**  
Devina Jaiswal¹, Zichao Bian¹, Alexander Almeida¹, Guoan Zheng¹, Kevin Claffey², and Kazunori Hoshino¹  
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health Center, Farmington, CT

#### 8:30 am

**Miniaturized High-Content Imaging Assays on 3D Cultured Cell Microarrays for Mechanistic Toxicity**  
Pranav Joshi¹, Akshata Datar¹, Alexander Roth¹, Kyeong Nam Yu¹, and Moo-Yeal Lee¹  
¹Cleveland State University, Cleveland, OH

#### 8:45 am

**Recreating 3D Tumor Microenvironment on a Chip for Screening Drug Delivery Systems**  
Yuan Tang¹, Fariborz Soroushi¹, Bin Wang¹,², Balabhaskar Prabhakarpandian¹, and Mohammad Kiani¹  
¹Temple University, Philadelphia, PA, ²Widener University, Chester, PA, ³CFD Research Corporation, Huntsville, AL

#### 9:00 am

**Roles of Interstitial Flows in Breast Cancer Cell Invasion Using a 3D Microfluidic Model**  
Yu Ling Huang¹, Chih-kuan Tung², Anqi Zheng³, Beum Jun Kim¹, and Mingming Wu¹  
¹Cornell University, Ithaca, NY, ²North Carolina A&T State University, Greensboro, NC, ³Cahn School of Medicine at Mount Sinai, New York, NY

#### 9:15 am

**Role of Lymphatic-Mimicking Small-Scale Fluid Shear Stress on Survival, Integrin Signaling, and Drug Response in Aggressive Human Lymphoid Tumors**  
FNU Apoorva¹, Ye Tian¹, and Ankur Singh¹  
¹Cornell University, Ithaca, NY

### OP-Fri-1-3  
**Auditorium 3**

**Tracks:** Biomechanics, Neural Engineering  
Concussion Biomechanics

**Chairs:** Jason Luck, Yujian Huang

#### 8:00 am

**Helmet Add-Ons Contribute to a Reduction in the Magnitude of Head Impacts Among Football Athletes**  
Kristopher Hendershot¹, Kelsey Evans¹, Lindsay Lee¹, Sanam Patel¹, Christopher Rothfus², Brian Liu², Nicole Kosorís², Shean Phelps², Russell Gore³, David Wright¹, Tamara Espinoza¹, and Michelle LaPlaca¹  
¹Emory University, Atlanta, GA, ²Georgia Tech Research Institute, Atlanta, GA, ³Georgia Tech / Emory University, Atlanta, GA

#### 8:15 am

**In Vivo Strains Vary by Brain Tissue Type and Cortical Region with Mild Angular Head Acceleration**  
Devan Chan¹, Andrew Knutsen², Yuan-Chiao Lu³, Sarah Yang³, Philip Bayly³, John Butman⁴, and Dzung Pham²  
¹Henry M Jackson Foundation, Bethesda, MD, ²Georgia Tech Research Institute, Alexandria, VA, ³Shepherd Center, Atlanta, GA, ⁴Uniformed Services University of the Health Sciences, Bethesda, MD, ⁵Washington University in St. Louis, St. Louis, MO, ⁶Radiology and Imaging Sciences, Bethesda, MD
8:30 am
Investigation of Football Head Impacts Through Development of a Dynamic Model
Michael Fanton1, Fidel Hernandez1, and David Camarillo1
1Stanford University, Stanford, CA

8:45 am
Investigation of Intraparenchymal Head Injury Mechanisms through Multivariate FE Simulation
Derek Jones1, Jillian Urban1, Ashley Weaver1, and Joel Stitzel1
1Wake Forest University, Winston-Salem, NC

9:00 am
Assessment of Single Season Accumulation of Head Impact Exposure in Youth Athletes
Jillian Urban12, Mireille Kelley12, Logan Miller12, Derek Jones12, and Joel Stitzel12
1Wake Forest School of Medicine, Winston Salem, NC, 2Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston Salem, NC

9:15 am
Astrocyte Reactivity Following Blast Exposure Involves Aberrant Histone Acetylation
Zachary Bailey1, Michael Grinert1, and Pamela VandeVord12
1Virginia Tech, Blacksburg, VA, 2Salem Veterans Affairs Medical Center, Salem, VA

OP–Fri–1–4 Room 102AB
Tracks: Cardiovascular Engineering, Tissue Engineering
Cardiovascular Tissue Engineering II

Chairs: Kareen Coulombe, Kartik Balachandran

8:00 am
Engineered In Vitro Disease Models for the Development and Validation of New Cardiac Therapies—INVITED
Kelly Sullivan1, Whitney Stoppel1, Breanna Duffy1, David Kaplan1, and Lauren Black12
1Tufts University, Medford, MA, 2Tufts University School of Medicine, Boston, MA

8:30 am
In Vivo Anastomosis and Perfusion of a 3D Printed PEG Hydrogel Containing Microvascular Networks
Samantha Paulsen1, Carol Chen2, Bagrat Grigoryan1, Nicholas Calafat1, Pavan Atluri2, and Jordan Miller1
1Rice University, Houston, TX, 2University of Pennsylvania, Philadelphia, PA

8:45 am
Temporal Control of ECM Composition in Ex Vivo Heart Valve Organ Cultures
Ana Porras1, Hongyu Rao1, Curtis Brandt1, and Kristyn Masters1
1University of Wisconsin-Madison, Madison, WI

9:00 am
Fabrication of Human Cardiac Tissue Using 3D Printing of High Resolution, ECM-Inspired Scaffolds
Molly Kupfer1, Ling Gao2, Jangwook Jung1, Patrick Zhang2, Libang Yang2, Quyen Tran1, Visar Ajeti2, Brian Freeman1, Paul Campagnola2, Jianyi Zhang12, and Brenda Ogle22
1University of Minnesota-Twin Cities, Minneapolis, MN, 2University of Minnesota-Twin Cities, Minneapolis, MN, 3University of Wisconsin-Madison, Madison, WI

9:15 am
Engineered hiPSC-Cardiac Tissue Propagates Electrical Impulses to Host in Infarcted Rat Hearts
Karen Coulombe1, Fabiola Munarin1, Tae Yun Kim12, Ulrike Mende12, and Bum-Rak Choi12
1Brown University, Providence, RI, 2Rhode Island Hospital, Providence, RI

OP–Fri–1–5 Room 102C
Track: Biomaterials*
Biomaterials for Immunoengineering I

Chairs: Silviya Zustiak, Qun Wang

8:00 am
Combinatorial Delivery of Multiple TLR Agonists Via Polymeric Pathogen Like Particles Synergistically Enhances Innate And Adaptive Immune Responses
Ranjna Madan-Lala1, Pallab Pradhan1, and Krishnendu Roy1
1Georgia Institute of Technology, Atlanta, GA

8:15 am
Expansion of Exhausted T Cells via Electrospun Poly(Dimethyl Siloxane)-based Fibrous Meshes
Alex Dang1, Danielle Bogdanowicz2, Helen Lu1, Lance Kam1, Jennifer Brown2, and Stacey Fernandes2
1Columbia University, New York, NY, 2Harvard Medical School, Boston, MA

8:30 am
Antibody-Modified-Conduit Blood Filtration: an Extra-corporeal Immune-Modulating Therapy for Sepsis
Riley Allen1, Jeff Ma1, and Jamal Lewis1
1University of California, Davis, Davis, CA

8:45 Aam
Revisiting the Immunogenicity (or Tolerogenicity) of Poly (lactic-co-glycolic acid)
Amir Bolandparvaz1, Jeffry Ma1, and Jamal Lewis1
1University of California, Davis, Davis, CA
9:15 am
Modification of PLGA Microparticles with the Immunomodulatory Protein CD200 Promotes Phagocytosis and Anti-inflammatory Cytokine Secretion by Macrophages
Esther Chen, Shu-Hui Chu, Andrea Tenner, and Wendy Liu
*University of California, Irvine, Irvine, CA

**Biomaterials Track sponsored by**

**OP-Fri-1-6**

**Room 101A**

**Tracks: Bioinformatics, Computational and Systems Biology, Cellular and Molecular Bioengineering**

**Theory and Practice of Synthetic Biology**

Chairs: Casim Sarkar, Megan McClean

**8:00 am**

**Spatial Segregation of Synthetic Circuit Output Using the Cell Surface**
Felicia Scott, Keith Heyde, and Warren Ruder
Virginia Tech, Blacksburg, VA

**8:15 am**

**A Toolkit for Optogenetic Control of Gene Expression in Saccharomyces Cerevisiae**
Cameron Stewart and Megan McClean
UW-Madison, Madison, WI

**8:30 am**

**Elucidating Response Dynamics of Multivalent Signal Transduction Hubs**
Wesley Errington, Patrick Holec, and Casim Sarkar
University of Minnesota, Minneapolis, MN

**8:45 am**

**Cell Lineage Tracing Using Nuclease Barcoding**
Stephanie Tzouanas Schmidt, Stephanie Zimmerman, Jianbin Wang, Stuart Kim, and Stephen R. Quake
Stanford University, Stanford, CA

**9:00 am**

**Bow-tie Signaling Topology Vulnerable to Age-Associated Decline**
Matthew Crane, Kenneth Chen, Peter Swain, and Matthew Kaeblerlein
University of Washington, Seattle, WA

**9:15 am**

**Employing Biomimetic Systems for Understanding the Affects of the Human Microbiome**
Keith Heyde and Warren Ruder
Virginia Polytechnic Institute and State University, Blacksburg, VA

**OP-Fri-1-7**

**Room 101B**

**Track: Cancer Technologies**

**Engineered Models of Glioma and the Tumor Microenvironment**

Chairs: Aleksander Skardal, Cyrus Ghajar

**8:00 am**

**Development and Characterization of Spontaneous Glioblastoma Mouse Models**
Chao Liu, Rebecca Klank, Ghaidan Shamsan, S. Joseph McFarren, Brooke Braman, Taner Akkin, David Largaespada, and David Odde
University of Minnesota, Minneapolis, MN

**8:15 am**

**Glioma Cell Invasion is Significantly Enhanced in Composite Hydrogel Matrices Composed of Chondroitin 4- and 4,6-Sulfated Glycosaminoglycans**
Meghan Logun, Nicole Bisel, Emily Tanasse, Wujun Zhao, Bhagyaa Gunasekera, Leidong Mao, and Lohitash Karumbaiah
University of Georgia, Athens, GA

**8:45 am**

**Brain-mimetic Hydrogels to Study Development of Glioblastoma Resistance to EGFR Inhibition**
Weikun Xiao, Rongyu Zhang, Songping Sun, Arshia Ehsanipour, Christopher Walthers, Jesse Liang, Lisa Ta, David Nathanson, and Stephanie Seidlits
University of California, Los Angeles, CA
OP–Fri–1–8 Room 101C
Track: Biomechanics

Injury Biomechanics I

Chairs: Jaydip Desai, Matthew Fisher

8:00 am
Adult Human Finite Element Models for Simulating Pedestrian Accidents
Costin Untaroiu1, Wansoo Pak1, Yunzhu Meng1, and Scott Gayzik2
1Virginia Tech, Blacksburg, VA, 2Wake Forest University, Winston-Salem, NC

8:15 am
Evaluation of Hearing Protection Devices to Blast Exposure Using Human Temporal Bone and 3D Ear Model
Rong Gan1, Don Nakmali1, and Kegan Leckness1
1University of Oklahoma, Norman, OK

8:30 am
Foot Flight after a Simulated Misstep Predicts Ladder Fall Severity
Erika Pliner1 and Kurt Beschorner1
1University of Pittsburgh, Pittsburgh, PA

8:45 am
Changes In Bone Mass After Body Weight Supported Treadmill Training In Spinal Cord Injury Rats
Gabrielle Gehron1, Brittany King2, Jaclyn Witko2, Jennifer Kadlowec3, and Anita Singh1
1Widener University, Chester, PA, 2Rowan University, Glassboro, NJ

9:00 am
Accurate Detection of On-Field Football Head Impacts Using an Instrumented Mouthguard
Lyndia Wu1, Calvin Kuo1, Jesus Loza2, Mehmet Kurt3, Kaveh Laksari1, Daniel Senif3, Scott Anderson1, Logan Miller2, Jillian Urban2, Joel Stitzel2, and David Camarillo1
1Stanford University, Stanford, CA, 2Wake Forest University, Winston-Salem, NC

9:15 am
Potential Injury Prevention Benefits of an Intersection Driver Assistance System
John Scanlon1 and Hampton Gabler1
1Virginia Tech, Blacksburg, VA

OP–Fri–1–9 Room 101D
Track: Tissue Engineering

Printing and Patterning in Tissue Engineering

Chairs: Monica Moya, Ashutosh Agarwal

8:00 am
Stereolithography of Engineered Tissues Containing Interpenetrating Vascular Networks–INVITED
Jordan Miller1
1Rice University, Houston, TX
8:30 am
Do Ingested Emulsiﬁers Disrupt the Intestinal Mucus Barrier?
Jaclyn Lock¹, Taylor Carlson¹, Charles Evans¹, and Rebecca Carrier¹
¹Northeastern University, Boston, MA

8:45 am
Evaluating a Biodegradable Piezoelectric Composite Scaffold for Cartilage Tissue Engineering
Ateka Khader¹ and Treena Arinzeh¹
¹New Jersey Institute of Technology, Newark, NJ

9:00 am
Imaging Pulmonary Distribution and Residence Time of Nano-in-Micro Particles
Joscelin Mejias¹,² and Krishnendu Roy¹,²
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA

9:15 am
Computational Analysis of Biomaterial-Based VEGF Delivery for Regenerative Medicine
Lindsay Clegg¹ and Felim Mac Gabhann¹
¹Johns Hopkins University, Baltimore, MD

8:45 am
Stiffness of Human Lung Tissue: An AFM Study on Aging and Tissue Thickness Effects
Delphine Sicard¹, Laura Fredenburgh², and Daniel Tschumperlin¹
¹Mayo Clinic, Rochester, MN, ²Brigham and Women’s Hospital, Boston, MA

9:00 am
Alveolar Type II Epithelial Cells Exhibit Age-dependent Differential Response to Mechanical Stretch and Monocyte Recruitment
Michael Valentine¹, Joseph Herbert¹, Franck Kamga Gnizenko¹, Matthew Schneck¹, Angela Reynolds¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

9:15 am
VE-cadherin Signals and Substrate Stiffness Regulate Force Transduction Through Endothelial Monolayers
Roberto Andresen Eguiluz¹, Mohammed Munim¹, and Deborah Leckband¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

OP–Fri–1–12 Room 200F
Track: Nano and Micro Technologies
Drug Screening Technologies
Chairs: Nilay Chakraborty, Jacqueline Linnes

8:00 am
Therapeutic Drug Monitoring of Antibiotics and Antifungals from Serum Using SERS
Adam Berger¹ and Ian White¹
¹University of Maryland, College Park, College Park, MD

8:15 am
Droplet-on-demand Platform for Combinatorial Screening of Drugs in C. elegans
Guillaume Aubry¹ and Hang Lu¹
¹Georgia Institute of Technology, Atlanta, GA

8:30 am
A Bioengineered Multi-organoid Body-on-a-Chip Platform for Advanced Drug Screening
Mahesh Devarasetty¹, Steven Forsythe¹, Sean Murphy¹, Thomas Shupe¹, Sang-Jin Lee¹, John Jackson¹, James Yoo¹, Shay Sokera¹, Colin Bishop¹, Anthony Atala¹, and Aleksander Skardal¹
¹Wake Forest School of Medicine, Winston-Salem, NC

8:45 am
Collagen Microtissues Facilitate Large-scale Studies of Cell-matrix Interactions
Alexandra Crampton¹, Marie-Elena Brett¹, and David Wood¹
¹University of Minnesota, Minneapolis, MN

9:00 am
Point-of-Detection Single-Cell Microchip for High-Throughput, Multiplexed Analysis of Cancer Cells
Jun Wang¹
¹SUNY Albany, Albany, NY
9:15 am
Anaerobic Conditions Reduce Damage to Red Blood Cells during Hypothermic Storage
Nathaniel Piety1, Julienne Stutz1, Nida Yilmaz1, Hui Xia1, Tatsuro Yoshida2, and Sergey Shevkoplyas1
1University of Houston, Houston, TX, 2New Health Sciences Inc., Bethesda, MD

OP–Fri–1–13 Room 200D
Track: Biomedical Imaging and Optics
Molecular Imaging

Chairs: Santosh Aryal, Rui Pereira

8:00 am
Development of a Protease-Activatable Nanoprobe for Molecular Imaging with Dual Energy CT
Jeffrey Ashton1, Cristian Badea2, and Jennifer West1
1Duke University, Durham, NC, 2Duke University Medical Center, Durham, NC

8:15 am
Using Indocyanine Green as a Control Agent in Paired-agent Fluorescence Imaging for Sentinel Lymph Node Metastases Detection
Chengyue Li1, Xiaochun Xu1, and Kenneth M. Tichauer1
1Illinois Institute of Technology, Chicago, IL

8:30 am
High-Definition Infrared Spectroscopic Imaging: Towards Automated Cancer Histopathology
Shachi Mittal1, Tomasz Wrobel2, L. Suzanne Leslie2, Andre Kadjacs-Balla3, and Rohit Bhargava1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Beckman Institute for Advanced Science and Technology, Urbana, IL, 3University of Illinois at Chicago, Chicago, IL

8:45 am
Exploratory Spectral Analysis for Comparison of High-Definition Infrared Imaging of Colon Samples with Standard-Definition Fourier Transform Infrared Imaging
Suamya Tiwari1, Shachi Mittal1, Tomasz Wrobel2, and Rohit Bhargava1
1University of Illinois at Urbana Champaign, Urbana, IL, 2Beckman Institute for Advanced Science and Technology, Urbana, IL

9:00 am
High Speed and High Definition Characterization of Prostate Cancer By Infrared Spectroscopic Imaging
Tomasz Wrobel1, Andre Kadjacs-Balla2, and Rohit Bhargava1
1University of Illinois, Urbana, IL, 2University of Chicago, Chicago, IL

9:15 am
Chemical Imaging of the Tumor Microenvironment with ToF-SIMS
Lara Gamble1, Blake Bluestein1, Daniel Graham1, Fionnuala Morrish2, David Hockenbery2, and Peggy Porter2
1University of Washington, Seattle, WA, 2Fred Hutchinson Cancer Research Center, Seattle, WA

OP–Fri–1–14 Room 200G
Track: Translational Biomedical Engineering
Micro/Nano Tools in Medicine

Chairs: Xuanhong Cheng, Shannon Weigum

8:00 am
Translating and Commercializing Biophotonics Imaging Technologies for Point-of-Care Devices—INVITED
Stephen Boppart1
1University of Illinois at Urbana-Champaign, Urbana, IL

8:30 am
Point-of-Care Compatible Sustained-Release Synthetic Biomarkers to Monitor Imminent Onset of Disease
Jaideep Dudani1, Colin Buss1, Reid Akana1, Gabriel Kwong2, and Sangeeta Bhatia1
1Massachusetts Institute of Technology, Cambridge, MA, 2Georgia Institute of Technology, Atlanta, GA

8:45 am
Point-of-care Diagnosis of M. Tuberculosis using Combined Immunomagnetic Enrichment and Acid-fast Staining
Nishal Shah1
1University of Pennsylvania, Philadelphia, PA

9:00 am
Rapid Screening/Diagnosis of Tuberculosis from Breath Using Functionalized TiO2 Nanotube Array Sensing Platform
Dhiman Bhattacharyya1, Mano Misra1, and Swomitra Mohanty2
1University of Utah, Salt Lake City, UT

9:15 am
Label-free Field Screening of Schistosoma haematobium Eggs in Urine Samples Using a Cost-effective Smartphone Based Microscope
Hatrice Ceylan Koydemir1, Isaac I. Bogoch2, Derek Tseng1, Richard K.D. Ephraim3, Evans Duah4, Joseph Tee4, Jason R. Andrews4, and Aydogan Ozcan1
1University of California Los Angeles, Los Angeles, CA, 2University of Toronto, Toronto, Canada, 3University of Cape Coast, Ghana, Ghana, 4Volta River Authority, Ghana, Ghana, 5Stanford University, Stanford, CA

OP–Fri–1–15 Room 200C
Tracks: Biomechanics, Bioinformatics, Computational and Systems Biology
Computational and Multiscale Modeling in Biomechanics I

Chairs: Taeyoon Kim, Siqi Wang

8:00 am
Subject-Specific Models to Predict Ankle Kinematics with Dual-Fluoroscopy as a Reference Standard
Jennifer Nichols1, Koren Roach1, Niccolo Fiorentino1, and Andrew Anderson1
1University of Utah, Salt Lake City, UT
8:15 am
Frequency-Dependent Penetration o Vibrotactile Stimulus In The Pacinian Corpuscle
Julia Quindlen¹, Burak Guclu², Eric Schepis³, and Victor Barocas¹
¹University of Minnesota, Minneapolis, MN, ²Bogaziçi University, Istanbul, Turkey, ³Syracuse University, Syracuse, NY

8:30 am
A Chemomechanical Computational Model for Cancer Cell Invasion in Stroma
Hossein Ahmadzadeh¹, Marie Webster¹, Ashani Weeraratna¹, and Vivek Shenoy¹
¹University of Pennsylvania, Philadelphia, PA

8:45 am
A Predictive Multiscale Model of Simulating Shear-Induced Platelet Activation
Peng Zhang¹, Chao Gao¹, Jawad Sheriff², Marvin Sleipan², Yuefan Deng¹, and Danny Bluestein¹
¹Stony Brook University, Stony Brook, NY, ²University of Arizona, Tucson, AZ

9:00 am
Tuning the Force Sensitivity of a Force Transducer at Intercellular Cadherin Adhesions
Deborah Leckband¹, Samantha Barrick¹, Jing Li¹, Alokanda Ray¹, and Emad Tajkhorshid¹
¹University of Illinois, Urbana, IL

9:15 am
A Bio-chemo-mechanical Model for Nuclear Mechanics During Cell Transmigration
Xuan Cao¹, Emad Moeendarbary², Philipp Isermann³, Patricia Davidson², Anya Burkart², Jan Lammerding³, Roger Kamm³, and Vivek Shenoy¹
¹University of Pennsylvania, Philadelphia, PA, ²Massachusetts Institute of Technology, Cambridge, MA, ³Cornell University, Ithaca, NY

8:45 am
Physicochemical and Biological Factors in Drug Eluting Stent Design—INVITED
Yen-Lane Chen¹
¹Boston Scientific, New Brighton, MN

9:00 am
Engineering Antibody Fabs for Long Acting Delivery to the Eye—INVITED
Devlin Tesar¹
¹Genentech, South San Francisco, CA

OP–Fri–1–17 Room 200B
Track: Device Technologies and Biomedical Robotics

Wearable Sensors and Devices
Chairs: Walt Baxter, Gary Brooking

8:00 am
Flexible Electronics and Data Interpretation Methods for Physiologic Monitoring—INVITED
Todd Coleman¹
¹University of California, San Diego, La Jolla, CA

8:30 am
MouthLab Tricorder Is Optimized for Rapid Medical Assessment
Jianzhou Xu¹, Yuankui Zhu¹, Hai Tang¹, Yang Hong¹, David Feller-Kopman¹, and Gene Fridman¹
¹Johns Hopkins University, Baltimore, MD

8:45 am
Development of a Reverse Iontophoresis Based Noninvasive Real Time Transdermal Biomarker Sensing Platform
Niraj K. Gupta¹, Yongsoon Hwang¹, and Brent D. Cameron¹
¹University of Toledo, Toledo, OH

9:00 am
A Wearable Wireless Multiple-Lead ECG Sensor Embedded in a Flexible Finger Ring
Quan Dong¹, Mona Zaghoul¹, and Zhenyu Li¹
¹George Washington University, Washington, DC

9:15 am
Clinical Validation of a New Consumer Sleep Monitoring Device
Erik Zavrel¹
¹Cornell University, New York, NY
MEET THE EXPERT
8:00 am–9:30 am Room 204

Collaborations for International Research
Organized by Dr. Jerry S.H. Lee, Deputy Director for Cancer Research and Technology, White House Cancer Moonshot Task Force

With advanced technologies shrinking the hurdles associated with conducting research in a global community, the need to develop and sustain international collaborations is critical for 21st century science. Panelists will share experiences developing, sustaining, and supporting international collaborations.

Panel Members:

- Owen McCarty, PhD FAHA, Professor & Interim Chair of Biomedical Engineering, Oregon Health & Science University
- Paul Pearlman, Science Policy Advisor, National Institutes of Health, National Cancer Institute, Center for Global Health
- Ryan Pawell, Founder and CEO of Indee
- Syril D. Pettit, Executive Director, Health and Environmental Sciences Institute (HESI)

SPECIAL SESSION
8:00 am–9:30 am Room 208AB

JOINT AAA-BMES SYMPOSIUM: Genome Editing Strategies in Bioengineering
Chairs: Lynne Opperman, Geert Schmid-Schonbein

8:00 am
Precision Genome Editing for Treating Single-gene Disorders
Ciaran Lee1 and Gang Bao1
1Rice University, Houston, TX

8:20 am
New MicroRNA Biotechnology to Inhibit Inflammation and Regenerate Bone
Brad Amendt1
1Craniofacial Anomalies Research Center, University of Iowa Carver College of Medicine

8:40 am
Using CRISPR-Cas9 to Unravel the Role of Glycans during Human Leukocyte-Endothelial Cell Adhesion
Sriram Neelamegham1
1State University of New York, Buffalo, NY

9:00 am
Mouse Models of Human Genetic Diseases Created by CRISPR/Cas9-mediated Genomic Engineering
Yongbo Lu1
1Department of Biomedical Sciences, Texas A&M University College of Dentistry, Dallas TX
**SPECIAL SESSION**

8:00 am—9:30 am Room 200J

**Whitaker Session**
Chair: Amie Schaefer  
Program Officer, Whitaker International Program Institute of International Education

Joseph Yu  
Whitaker International Fellow, 2013  
Host Institution: Imperial College London, UK  
**Topic:** Comprehensive Training in Cardiovascular Research and Biomedical Engineering Entrepreneurship

Brandon Walters  
Whitaker International Fellow, 2014  
Host Institution: Eberhard Karls University of Tubingen, Germany  
**Topic:** Quantifiably Controlling Mesenchymal Stem Cell Morphology by Application of Tuned Cyclic Strain and the Effects of These Changes on Smooth Muscle Cell Differentiation

Erin Coonahan  
Whitaker International Fellow, 2013  
Host Institution: Engineering World Health, Honduras  
**Topic:** Technician Training Programs to Improve Access to Healthcare in Honduras

Colin Hisey  
Whitaker International Fellow, 2015  
Host Institution: University of Navarra, Spain  
**Topic:** A Microfluidic Device for Controlled Cell Placement and 1D Migration on Biomimetic Structures

Alisha Geldert  
Whitaker International Fellow, 2015  
Host Institution: National University of Singapore  
**Topic:** Investigation of Aptamer-based Sensing for Malaria Detection

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**INDUSTRY SESSION—SBIR/STTR**

8:00 am—9:00 am Room 201

**Chairs:** Ben Noe

This panel will give an overview of SBIR and STTR grants, including requirements, how to apply, best practices to consider, and watch outs to avoid.

**INDUSTRY SESSION—Reimbursement**

9:15 am—10:15 am Room 201

**Chairs:** Ben Noe

This panel will discuss the current landscape and policies surrounding reimbursement for drugs, devices, procedures, and therapies and its impact on manufacturers.

**INDUSTRY SESSION**

12:00 noon—1:30 pm Room 201

**Healthcare Innovations with Physicians**  
**Chair:** Ben Noe

One of the challenges in biomedical engineering careers is developing an understanding of current and anticipated unmet clinical needs, and how to address those needs with existing and new technologies. The audience will be treated to a detailed view, from clinicians, on how real-world problems in orthopedics, neurology, and transplantation can be addressed with biomedical engineering solutions.
**Friday, October 7 | 1:45 pm–3:15 pm | Platform Session 2**

**OP-Fri-2-1  Auditorium 1**

**Tracks: Cellular and Molecular Bioengineering, Biomechanics**

**Mechanotransduction**

*Chairs: Paul Sundaram, Anthony Passerini*

1:45 pm  
**Exercise Increases the Population of Myofibroblasts and Enhances the Pericellular Matrix in Fatigue Damaged Tendons**

Rebecca Bell1, N. Remi Gendron2, Matthew Anderson2, Evan L. Flatow2, and Nelly Andarawis-Puri1

1Cornell University, Ithaca, NY, 2Icahn School of Medicine at Mount Sinai, New York, NY

2:00 pm  
**Effects of Mechanical Stimulation on Collagen Synthesis in Aged Human Dermal Fibroblasts**

Aribet De Jesus1, Sathivel Chinnathambi1, Mariam El-Hattab1, Douglas Henstrom1, and Edward Sander1

1University of Iowa, Iowa City, IA

2:15 pm  
**Piezo1 Regulates Mechanotransductive Release of ATP from Human RBCs**

Jiandi Wan1, Eyup Cinar1, Sitong Zhou1, James DeCourcey1, Yixuan Wang2, and Richard Waugh3

1Rochester Institute of Technology, Rochester, NY, 2University of Science and Technology, Beijing, China, People’s Republic of, 3University of Rochester, Rochester, NY

2:30 pm  
**Improving the Contractile Properties of Mesenchymal Stem Cells by Expressing NANOG**

Aref Shahini1, Panagiotis Mistriotis1, Mohammadnabi Asmani1, Ruogang Zhao1, and Stelios Andreadis1

1University at Buffalo, The State University of New York, Buffalo, NY

2:45 pm  
**Keratin 8/18 Regulation of Collective Epithelial Cell Contractility**

Francois Bordeleau1, Charles-Antoine Lamontagne2, Cynthia Reinhart-King1, Yves De Koninck2, and Normand Marceau2

1Cornell University, Ithaca, NY, 2Université Laval, Quebec, QC, Canada

3:00 pm  
**Epidermal Growth Factor Receptor Mediates E-cadherin Force Transduction in Epithelia**

Deborah Leckband1, Ismaael Muhamed1, Jun Wu1, Poonam Sehgal1, and Xinyu Kong1

1University of Illinois, Urbana, IL

**OP-Fri-2-2  Auditorium 2**

**Tracks: Cancer Technologies, Nano and Micro Technologies**

**Microscale Cancer Cell Analysis**

*Chairs: Alptekin Aksan, Ming Su*

1:45 pm  
**Single Cell Cytokine Analysis of Circulating Hematopoietic Cells in Myeloproliferative Diseases**

Rong Fan1

1Yale University, New Haven, CT

2:00 pm  
**Detection of an Ovarian Cancer Biomarker Via an Implantable Single-Walled Carbon Nanotube Biosensor**

Ryan Williams1, Christopher Lee1, Thomas Galassi2, Maria Sirenko1, Janki Shah1, Jackson Harvey2, Douglas Levine1, and Daniel Heller1

1Memorial Sloan Kettering Cancer Center, New York, NY, 2Weill Cornell Medicine, New York, NY

2:15 pm  
**Isolation and Molecular Profiling of Tumor-specific Extracellular Vesicles Using Microfluidic Technologies**

Eduardo Reategui1,2, Kristian van der Vos3, Charles P. Lai3, Mahnaz Zeinali1,2, Leonor Balaj1, David T. Tung2,4, Brian V. Nahed1, Xandra O. Breakefield3, and Shannon L. Stott1,2,4

1Center for Engineering in Medicine, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA, 2Massachusetts General Hospital Cancer Center, Harvard Medical School, Charlestown, MA, 3Department of Neurology, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA, 4Department of Medicine, Massachusetts General Hospital, Harvard Medical School, Charlestown, MA, 5Massachusetts General Hospital Brain Tumor Center/Pappas Center for Neurooncology, Boston, MA

2:30 pm  
**Microfluidic Digital Melt Array for Accessing Rare Methylation Biomarkers in Cancer**

Christine O’Keefe1, Thomas Piasnic1, Pornpat Athamanolop1, Helena Zec1, and Tza-Huei Wang1

1Johns Hopkins University, Baltimore, MD

2:45 pm  
**Rapid Microfluidic Analysis Of Primary Tumor Cell Viscoelasticity**

Lionel Guillou1, Joanna Dahl2, Jung Ming Lin2, Abdul Barakat1, Julien Husson1, Susan Muller2, and Sanjay Kumar2

1Ecole Polytechnique, Palaiseau, France, 2UC-Berkeley, Berkeley, CA

3:00 pm  
**Adhesion-based Tumor Cells Capture Using Nanotopography**

Lin Shi1, Kai Wang1, and Yong Yang1

1West Virginia University, Morgantown, WV
Friday, October 7 | 1:45 pm–3:15 pm | Platform Session 2

**OP–Fri–2–3**  
*Auditorium 3*

**Tracks: Biomechanics, Neural Engineering**  
**Traumatic Brain Injury Biomechanics & Repair**  

*Chairs: Liying Zhang, Deva Chan*

**1:45 pm**  
**Biomechanical Response, Neuropathology and Biomarker Expression in an Experimental Model of Traumatic Brain Injury—INVITED**  
Liying Zhang¹, John Cavanaugh¹, Yan Li¹, and Srinivas Kallakuri²  
¹Wayne State University, Detroit, MI

**2:00 pm**  
**The Spatial and Temporal Deformation Pattern of the Brain from Blunt Trauma**  
Brian Swenson¹, Chen Miao¹, Namás Chandra¹, and Bryan Pfister¹  
¹New Jersey Institute of Technology, Newark, NJ

**2:15 pm**  
**Quantifying Hypothermia Treatment Efficacy on 3D Neuronal Cultures Following Traumatic Brain Injury**  
Mark Scimone¹,², Alana Levine¹, Jonathan Estrada², Harry Cramer¹,², Paul Hopkins¹,², and Christian Franck¹,²  
¹Center for Biomedical Engineering, Brown University, Providence, RI, ²School of Engineering, Brown University, Providence, RI

**2:30 pm**  
**In Situ Estimation of Strain Thresholds for Axon Failure as a Function of Macroscopic Stretch**  
Sagar Singh¹, Assimina Pelegri¹, and David Shreiber¹  
¹Rutgers University, Piscataway, NJ

**2:45 pm**  
**Comparative Modeling of Blast- and Impact-Induced Traumatic Brain Injury**  
Andrew Fisher¹, Olga Minaeva¹, Chad Tagge¹, Mark Wojnarowicz², Amanza Gaudreau Balderrama¹, Juliet Moncaster², Noel Casey², Robin Cleveland³, Andrew Anderson⁴, William Moss⁴, Ann Mckee⁴,⁵, and Lee Goldstein¹,²  
¹Boston University, Boston, MA, ²Boston University School of Medicine, Boston, MA, ³University of Oxford, Oxford, United Kingdom, ⁴Lawrence Livermore National Laboratory, Livermore, CA, ⁵Boston VA Healthcare System, Jamaica Plain, MA

**3:00 pm**  
**A Smart Helmet Based On Wearable MEMS Sensors and A Soft Airbag To Prevent Head Trauma**  
Mehmet Kurt¹, Neil Hildick Smith¹, Michael Fanton¹, and David Camarillo¹  
¹Stanford University, Stanford, CA

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**OP–Fri–2–4**  
*Room 102AB*

**Tracks: Cardiovascular Engineering, Tissue Engineering**  
**Cardiovascular Tissue Engineering III**  

*Chairs: Brenda Ogle, Pinar Zorlutuna*

**1:45 pm**  
**Tissue Engineered Models for Characterizing Vascular Mechano-Adaptation—INVITED**  
Patrick Alford¹, Zaw Win¹, Kerianne Steucke¹, and Eric Haid¹  
¹University of Minnesota, Minneapolis, MN

**2:15 pm**  
**Development of Novel Antioxidant-Nitric Oxide Donor Hybrid Compound and Its Carrier for PAD Treatment**  
Duong Le¹, Aneetta Kuriakose¹, Suchismita Acharya¹, and Kytai Nguyen¹  
¹University of Texas at Arlington, Arlington, TX

**2:30 pm**  
**Mechanocompatible Polymer-Extracellular Matrix Composites for Vascular Tissue Engineering**  
Bin Jiang¹, Rachel Suen¹, Jiao-Jing Wang², Zheng Zhang², Jason Wertheim², and Guillermo Ameer¹  
¹Northwestern University, Evanston, IL, ²Northwestern University, Chicago, IL

**2:45 pm**  
**Injectable Hydrogels as a Regenerative Medicine Therapy for Peripheral Arterial Disease**  
Abbygail Foster¹, Lei Cai¹, Ruby Dewi¹, Zachary Strassberg¹, Ngan Huang¹, and Sarah Heilshorn¹  
¹Stanford University, Stanford, CA

**3:00 pm**  
**Exercise-Induced iPSC-based Disease Modeling of Human Hypertrophic Cardiomyopathies**  
Zhen Ma¹, Sangmo Koo¹, Mohammad Mandegar², Nathaniel Huebsch², Brian Siemons¹, Costas Grigoropoulos¹, Bruce Conklin², and Kevin Healy¹  
¹University of California, Berkeley, Berkeley, CA, ²Gladstone Institute, San Francisco, CA

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**OP–Fri–2–5**  
*Room 102C*

**Track: Biomaterials**

**Biomaterials for Immunoengineering II**  

*Chairs: Ioannis Zervantonakis, Jungwoo Lee*

**1:45 pm**  
**Improved Deliveries of Anti-Cancer Immunogenic Factors Using Magnetically Responsive Biomaterials**  
Anita Tolouei¹ and Stephen Kennedy¹  
¹University of Rhode Island, Kingston, RI

**2:00 pm**  
**Dendritic Cells Treated with Extracellular Indoleamine 2,3 Dioxygenase Maintain an Immature Phenotype and Suppress Antigen-specific T cell Proliferation**  
Evelyn Bracho-Sanchez¹, Azadeh Hassanzadeh¹, Mark Wallet¹, and Benjamin Keselowsky¹  
¹University of Florida, Gainesville, FL

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BMES 2016 | Minneapolis
2:15 pm
Combination Nanovaccine Induces Rapid Protective Immunity against Yersinia pestis
Sean Kelly1, Danielle Wagner-Muniz2, Thomas Dubensky2, Bryan Bellaire3, Michael Wannemuehler4, and Balaji Narasimhan1
1Iowa State University, Ames, IA, 2Aduro Biotech, Berkeley, CA

2:30 pm
Keratin Biomaterials Augment Anti-Inflammatory Macrophage Phenotype In-Vitro
Michele Waters1, Pamela VandeVord1, and Mark Van Dyke1
1Virginia Tech, Blacksburg, VA

2:45 pm
The Effect of Substrate Rigidity on Induction of Regulatory T cells from Conventional T cells
Neha Nataraj1, Joung-Hyun Lee1, Alex Dang1, and Lance Kam1
1Columbia University, New York, NY

3:00 pm
Serum Albumin Controls Charge-Mediated Adhesion and Isolation of Cancer Cells and Leukocytes Under Flow
Michael Mitchell1, Carlos Castellanos2, and Michael King2
1MIT, Cambridge, MA, 2Cornell University, Ithaca, NY

* Biomaterials Track sponsored by

OP–Fri–2–6 Room 101A

OP–Fri–2–7 Room 101B

Tracks: Cancer Technologies, Biomechanics

Cancer Mechanobiology I

Chairs: Gabe Kwong, Scott Verbridge

1:45 pm
Nuclear Rupture and Mechanics during Cancer Cell Migration in Confined Environments—INVITED
Jan Lammerding1
1Cornell University, Ithaca, NY

2:00 pm
Extracellular Matrix Stiffness Regulates Tumor Vasculature Phenotype
Francois Bordeleau1, Brooke Mason1, Emmanuel Lollis1, Michael Mazzola1, Sahana Somasegar1, Joseph Califano1, Christine Montague1, Danielle LaValley1, John Huynh1, Yashira Negron Abril1, Robert Weiss1, Lawrence Bonassar1, Jonathan Butcher1, and Cynthia Reinhart-King1
1Cornell University, Ithaca, NY

2:15 pm
A Bulky Glycocalyx Drives Proliferation in the Metastatic Niche
Elliot Woods1
1UC Berkeley, Burlingame, CA

2:30 pm
Cancer-Associated Fibroblasts Exhibit Stiffness Dependent Matrix Deformations and Vascularization Potential
Mary Kathryn Sewell-Loftin1, Taylor Hughes1, Elizabeth Crist1, Samantha van Hove1, Gregory Longmore1, and Steven George1
1Washington University in St. Louis, St. Louis, MO
2:45 pm  
**HEMICA-Hydrogel Encapsulated Micro-channel Array in Cancer Metastasis**  
Alexandros Afthinos1, Runchen Zhao1, Adam Suppes1, and Konstantinos Konstantopoulos1  
1The Johns Hopkins University, Baltimore, MD

3:00 pm  
**Stiffness-Induced Evolution of EGF and Integrin Signaling Alters Cancer Cell Motility via Calpain 2**  
Alyssa Schwartz2, Christopher Hall1, and Shelly Peyton1  
1University of Massachusetts Amherst, Amherst, MA

**OP-Fri-2-8**  
**Track: Biomechanics**  
**Injury Biomechanics II**  
*Chairs: Jaydip Desai, Matthew Fisher*

1:45 pm  
**Changing Fibrous Architecture of The Periodontal Ligament Due to Periodontitis Modeled With A Transverse Isotropic Hyperelastic Model**  
David Nedrelow1 and Victor Barocas1  
1University of Minnesota, Minneapolis, MN

2:00 pm  
**Evaluation of Brain Response Following Head Impact in Youth Athletes Using an Anatomically Accurate Finite Element Model**  
Logan Miller1,2, Mireille Kelley1,3, Derek Jones1,3, Jillian Urban1,2, Steven Rowson4, and Joel Stitzel1,3  
1Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, 2Wake Forest University School of Medicine, Winston Salem, NC, 3Wake Forest University School of Medicine, Winston-Salem, NC, 4Virginia Tech, Blacksburg, VA

2:15 pm  
**Characterization of Thoracic Loading as a Result of Same Level Forward Falls**  
Stephanie Beeman1 and Andrew Kemper1  
1Virginia Tech, Blacksburg, VA

2:30 pm  
**Thoracoabdominal Injury Risk in a Human Model as Result of Pre-Crash Braking**  
Berkan Guleyupoglu1, Jeremy Schap1, Matthew Davis1, and Scott Gayzik1  
1Wake Forest University School of Medicine, Winston Salem, NC

2:45 pm  
**Investigation of CSF Cavitation As An Injury Mechanism Of Traumatic Brain Injury**  
Allen Yu1, Barclay Morrison III2, David Meaney3, and Cameron Bass1  
1Duke University, Durham, NC, 2Columbia University, New York, NY, 3University of Pennsylvania, Philadelphia, PA

3:00 pm  
**Development and Validation of Infant Skull Fracture Predictors for Low-Height Falls**  
Marzieh Memar1, Brittany Coats2, Ingrid Lan1, Sarah Sullivan1, and Susan Margulies1  
1University of Pennsylvania, Philadelphia, PA, 2University of Utah, Salt Lake City, UT

**OP-Fri-2-9**  
**Room 101D**  
**Tracks: Tissue Engineering, Nano and Micro Technologies**  
**Organ-on-Chip Models for Study of Disease and Drug Discovery I**  
*Chairs: Yaakov Nahmias, Salman Khetani*

1:45 pm  
**Microengineered Physiological Biomimicry: Human Organs-on-Chips—INVITED**  
Dan Dongeun Huh1  
1University of Pennsylvania, Philadelphia, PA

2:15 pm  
**Real-Time Monitoring of Metabolic Function In Liver-On-Chip Microdevices Tracks The Dynamics Of Mitochondrial Dysfunction**  
Danny Bavli1, Sabina Tsytkin-Kirschzenzweig1, Sebastian Prill1, Elishai Ezra1, Magnus Jaeger2,3, and Yaakov Nahmias1  
1The Hebrew University of Jerusalem, Jerusalem, Israel, 2Fraunhofer Institute for Cell Therapy and Immunology, Potsdam, Germany, 3Federal Institute for Risk Assessment, Berlin, Germany

2:30 pm  
**Lego-inspired Organ-on-a-Chip Gelatin Methacryloyl Microfluidic System**  
Julio Aleman1,2,3, Yu Shrike Zhang4,4,5, Aleksander Skardal6,7, and Ali Khademhossein2,3,4,5  
1Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, 2Wake Forest School of Medicine, Winston Salem, NC, 3Biomaterials Innovation Research Center, Cambridge, MA, 4Harvard-MIT Division of Health Sciences and Technology, Cambridge, MA, 5Wyss Institute for Biologically Inspired Engineering, Boston, MA, 6Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston Salem, NC, 7Comprehensive Cancer Center of Wake Forest University School of Medicine, Winston Salem, NC

2:45 pm  
**Human Pulmonary Thrombosis-on-a-Chip**  
Abhishek Jain1,3, Riccardo Barrell4, Andries van der Meer1, Akiko Mamamoto3, Karen De Ceunynck2, Omozaunvo Aisiku1, Monica Otieno5, Calvert Louden5, Geraldine Hamilton4, Robert Fluenenhaft2, and Donald Ingber1,3,7  
1Wyss Institute for Biologically Inspired Engineering at Harvard University, Boston, MA, 2Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, 3Boston Children's Hospital, Harvard Medical School, Boston, MA, 4Cedar Sinai Medical Center, Los Angeles, CA, 5Janssen Pharmaceutical Research and Development, Spring House, PA, 6Emulate Inc., Boston, MA, 7Harvard Paul A. Johnson School of Engineering, Cambridge, MA
**OP-Fri-2-10**  
**Track: Biomaterials*  
**Natural and Bioinspired Materials I**

* **Chair**: Rebecca Willits, Evan Scott

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>1:45 pm</td>
<td>Biomaterials for Probing the Biological Functions of the Glycocalyx—INVITED</td>
<td>Kamil Godula1, University of California, San Diego, La Jolla, CA</td>
</tr>
<tr>
<td>2:15 pm</td>
<td>A Simple and Scalable Method To Retrieve Natural Mucin For Functional Reconstitution Of Mucosal Barrier</td>
<td>Abhinav Sharma1, Neil Forbes2,3, and Jungwoo Lee1,2,3, University of Massachusetts Amherst, Amherst, MA, Institute for Applied Life Sciences, Amherst, MA, Molecular and Cellular Biology Graduate Program, Amherst, MA</td>
</tr>
<tr>
<td>2:30 pm</td>
<td>Design and Synthesis of Di-Block Copolymer for Boundary Lubrication of Articular Cartilage</td>
<td>Zhexun Sun1, Elizabeth Feeney1, Sierra Cook1, Can Zhou1, Ya Guan1, Delphine Gourdon1, Lawrence Bonassar1, and David Putnam1, Cornell University, Ithaca, NY</td>
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<tr>
<td>2:45 pm</td>
<td>Synthetic Communication Between Artificial and Natural Cells</td>
<td>Yunfeng Ding1, Eliza Morris1, and Cheemeng Tan1, University of California Davis, Davis, CA</td>
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<tr>
<td>3:00 pm</td>
<td>Fibrin and Fibrinogen Differentially Regulate Macrophage Inflammatory Activation</td>
<td>Jessica Hsieh1, Thi Tran1, Elliot Botvinick2, and Wendy Liu1, University of California, Irvine, Irvine, CA, Edwards Life-sciences Center for Advanced Cardiovascular Technology, Irvine, CA</td>
</tr>
</tbody>
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* Biomaterials Track sponsored by ACS Biomaterials Science & Engineering
2:00 pm
An Ecological Understanding of Quorum Sensing-Based Bacteriocin Synthesis—INVITED
Ting Lu¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

2:15 pm
Lipidoid Tail Structure Strongly Influences siRNA Delivery Activity—INVITED
Christopher Knapp¹ and Kathryn Whitehead¹
¹Carnegie Mellon University, Pittsburgh, PA

2:30 pm
Interrogating Canonical Wnt Signaling Pathway in Human Pluripotent Stem Cell Fate Decisions using CRISPR-Cas9—INVITED
Xiaojun Lian¹
¹Penn State University, University Park, PA

2:45 pm
Mechanisms of Reduced Astrocyte Surface Coverage in Cortical Cells on Nanoporous Gold Films—INVITED
Christopher Chapman¹, Hao Chen¹, Marianna Stamou¹, Pamela Lein¹, and Erkin Seker¹
¹University of California, Davis, Davis, CA

3:00 pm
Craig Duvall¹, Kameron Kilchrist¹, Brian Evans¹, and Colleen Brophy¹
¹Vanderbilt University, Nashville, TN

OP–Fri–2–14 Room 200G
Track: Biomedical Engineering Education (BME)

Biomedical Design

Chairs: Matthew Glucksberg, Kathleen Sienko

1:45 pm
Risk-free Student Self-Assessment of Design Projects
Michael Caplan¹
¹Arizona State University, Tempe, AZ

2:00 pm
Incorporation of Needs Finding Improves Student Understanding in a Bioengineering Design Course
Bilal Ghosn¹
¹Rice University, Houston, TX

2:15 pm
A Device to Simultaneously and Accurately Measure Heart Rate and Acceleration
Rachel Yung¹, Michael Mudgett¹, and Eileen Haase¹
¹Johns Hopkins University, Baltimore, MD

2:30 pm
User-Centered Design in a Biomedical Engineering Module: Addressing Hearing Loss in the Elderly
Nailah Conrad¹, Tinashe Mutsvangwa¹, Anastasia Doyle¹, and Tania Douglas¹
¹University of Cape Town, Cape Town, South Africa

2:45 pm
Teaching Engineering Design for Global Engagement: Understanding Constraint
Russell Jamison¹
¹Virginia Commonwealth University, Richmond, VA

3:00 pm
Cross-Disciplinary Design Teams for Biomedical Engineering Design
Conrad Zapanta¹, Wayne Chung¹, and Corrine Bacigal¹
¹Carnegie Mellon University, Pittsburgh, PA
2:00 pm
Effect of NGF Delivering Conduit On Peripheral Nerve Regeneration
Pratima Labroo1, Isak Goodwin1, Brett Davis1, Kyle Edwards1, Scott Ho1, Himanshu Sant1, Bruce Gale1, Jill Shea1, and Jay Agarwal1
1University of Utah, Salt Lake City, UT

2:15 pm
Giacomo Bruno1,2, Thomas Geninatti1,3, Giulia Rizzo2, Danilo Demarchi2, and Alessandro Grattoni1
1Houston Methodist Research Institute, Houston, TX, 2Politecnico di Torino, Turin, Italy, 3University of Chinese Academy of Sciences, Beijing, China, People’s Republic of China

2:30 pm
Off-Target Effects of Nanoparticle (NP)-Mediated siRNA Delivery to Mesenchymal Stem Cells (MSCs)
Dominic Malcolm1,2, Janet Sorrells1, and Danielle Benoit1,2
1University of Rochester, Rochester, NY, 2University of Rochester Medical Center, Rochester, NY

2:45 pm
A Magnetic Switch for Controlling Viral Gene Delivery In Vivo
Sheng Tong1, Haibao Zhu1, and Gang Bao1
1Rice University, Houston, TX

3:00 pm
Targeting Host Alveolar Macrophages via Mannosylated Antibiotic Prodrug Polymers
Jasmin Chen1 and Daniel Ratner1
1University of Washington, Seattle, WA
2:45 pm
Reduced Bacterial Growth on Titanium Screws with Nanophase TiO2 Surface Treatment
Garima Bhardwaj1 and Thomas Webster1
1Northeastern University, Boston, MA

3:00 pm
Ultrastructural Changes in Osteogenesis Imperfecta Bone: Synchrotron Study of a Murine Model
Jitin Samuel1, Abusaleh Ahsan1, and Xiaodu Wang1
1University of Texas at San Antonio, San Antonio, TX

OP–Fri–2–18 Room 200I
Track: Biomaterials*
Drug Delivering Biomaterials I
Chairs: Jerald Redmond, Kimberly Stroka

1:45 pm
Quinacrine Mediated Sensitization of Glioblastoma (GBM) Cells to TRAIL through MMP-sensitive PEG Hydrogel Nanocarriers
Pelin Erkoc1, Ahmet Cingoz1, Tugba Bagci-Onder1, and Seda Kizilel1
1Koc University, Istanbul, Turkey

2:00 pm
Discrete Polymeric Nanowires as a Platform for Immunomodulation and Tissue Engineering
Colin Zamecnik1, Margaret Lowe2, David Patterson2, Michael Rosenblum2, and Tejal Desai2
1UCB-UCSF Joint Graduate Program in Bioengineering, San Francisco, CA, 2University of California, San Francisco, San Francisco, CA

2:15 pm
Shear-Reversible Nonaqueous Nanocomposites for Local Delivery of Combination Drugs
Anthony Tabet1, Vinh Tran1, Macallum Brabender1, and Chun Wang1
1University of Minnesota, Minneapolis, MN

2:30 pm
Post-Implantation Drug Reloading of Devices Is Not Affected By Bacterial Biofilm
Erika Cyphert1, Sean Zuckerman1, and Horst von Recum1
1Case Western Reserve University, Cleveland, OH

2:45 pm
Bioglass and Growth Factor Substrate Additives for Mesenchymal Stem Cell Induction
Roche de Guzman1, Daniel Foyt1, Vasilios Lianos1, Emily Diaz2, Miguel Hutchinson2, Bethany Dill2, and Grzegorz Polak1
1Hofstra University, Hempstead, NY

3:00 pm
Sustained Release of siRNA via Tethering to Hydrogels
Nicholas Kwon1, Minh Khanh Nguyen1, Alex Gilewski1, Samantha Wilner2, Keith Maier2, Matthew Levy2, and Eben Alsberg1
1Case Western Reserve University, Cleveland, OH, 2Albert Einstein College of Medicine, Bronx, NY

* Biomaterials Track sponsored by

OP–Fri–2–19 Room 200J
Track: Cardiovascular Engineering
Heart Valve Structure, Function and Disease I
Chairs: Gretchen Mahler, Arash Keradvar

1:45 pm
Role of Proinflammatory NFkB Signaling in Regulating Aortic Valve Calcific Potential
Terence Gee1, Emily Farrar1, Kevin Hsu2, Bin Zhou2, and Jonathan Butcher1
1Cornell University, Ithaca, NY, 2Albert Einstein College of Medicine, Bronx, NY

2:00 pm
Decreased Cell Adhesion Strength Promotes Endothelial to Mesenchymal Transformation
Jonathan Bramsen1, Sudip Dahal1, Sara Mina1, Chris Maiorana1, Guy German1, Bruce Murray2, Peter Huang2, and Gretchen Mahler1
1Binghamton University, Department of Biomedical Engineering, Binghamton, NY, 2Binghamton University, Department of Mechanical Engineering, Binghamton, NY

2:15 pm
CD44 Signaling Promotes Mineralization in an In Vitro Model of CAVD
Lauren Baugh1 and Lauren Black1
1Tufts University, Medford, MA

2:30 pm
The Distribution of Cell Spread Area and Stress Fiber Alignment in Aggregates Indicates a Role for Cell Tension in Calcific Aortic Valve Disease
Heather Cirka1, Vivian Liang1, and Kristen Billiar1
1Worcester Polytechnic Institute, Worcester, MA

2:45 pm
Patient-Specific Modeling of Transcatheter Aortic Valve Implantation: An In-Vitro Study
Hoda Hatoun1, Atieh Yousefi1, Pablo Maureira2, Jennifer Dollery3, Juan A. Crestanello3, and Lakshmi Prasad Dasi1
1The Ohio State University, Columbus, OH, 2CHU de Nancy, Nancy, France, 3Division of Cardiothoracic Surgery, Wexner Medical Center, The Ohio State University, Columbus, OH

3:00 pm
Effect of Positioning and Heart Beating on Transcatheter Aortic Valve Performance
Matteo Bianchi1, Ram Ghosh1, Gil Marom1, Oren Rotman1, Marvin Slepian1, and Danny Bluestein1
1Stony Brook University, Stony Brook, NY
MEET THE EXPERT
1:45 pm–3:15 pm  Room 204
Meet the Journal Editors
Organized by Dr Pep Pàmies, Chief Editor, Nature Biomedical Engineering

The ever growing amounts of increasingly accessible scientific results as well as growing competition for funding have increased the demands for researchers to show the quality, impact and reach of their scientific publications. Yet there is ample disagreement on how to measure impact and reach. A panel of editors will discuss strategies for researchers in biomedical engineering to improve the dissemination of their results. The session will feature 5-min presentations from each of the panel members and a round-table discussion.

Panel members:
- Prof Kam Leong
  Department of Biomedical Engineering, Columbia University, and Editor-in-Chief of Biomaterials
- Prof Michael King
  Department of Biomedical Engineering, Cornell University, and Editor-in-Chief of Cellular and Molecular Bioengineering
- Prof David Odde
  Department of Biomedical Engineering, University of Minnesota, and Editorial Board Member,
- Biophysical Journal
- Dr Pep Pàmies
  Chief Editor, Nature Biomedical Engineering

INDUSTRY SESSION—Mobile/Digital Health
2:00 pm–3:00 pm  Room 201
Chairs: Ben Noe

The Mobile/Digital Health panel will discuss latest news and trends including, but not limited to, the following topics: personalized medicine, big data, health and fitness apps, and integration of devices and high tech.

INDUSTRY SESSION—Investment Pitches and Partnering
3:15 pm–5:15 pm  Room 201
Chairs: Ben Noe

This session will feature four venture capitalists who will be hearing pitches from start-up companies for funding opportunities. All meeting attendees are welcome to sit in the audience to watch the pitches.

SPECIAL SESSION
2:00 pm–5:00 pm  Room 102DEF
BMES-NSF Special Session on Research in Biomedical Engineering and Grant Writing
*pre-registration required

BMES and the National Science Foundation (NSF) will convene a special session focused on innovative research in biomedical engineering and grant writing. The session will bring together NSF Bioengineering and Engineering Healthcare grantees, young investigators, junior and senior faculty, and post-doctoral fellows for idea exchange and networking related to conducting and funding cutting-edge research in BME. The session will showcase NSF funded research and researchers, foster collaboration and idea exchange, familiarize participants with NSF funding mechanisms, and provide strategies for preparing competitive grant proposals, in particular NSF CAREER, EAGER and unsolicited grant applications. The research areas where the NSF Biomedical Engineering Program supports fundamental and transformative research will also be discussed. Participants will gain an increased awareness of NSF funded research, a better understanding of NSF funding opportunities and how to prepare successful grant applications, and a chance to establish new relationships leading to future collaborations. This material is based upon work supported by the National Science Foundation under Grant No. CBET-1628295. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

SPECIAL SESSION
3:15 pm–6:15 pm  Room 208AB
The 4th US-Korea Joint Workshop on Biomedical Engineering
Chair: Hanjoong Jo, Ho-Wook Jun

Korean American Biomedical Engineering Society (KBMES) would like to invite you to the Fourth Korea-US Joint Biomedical Engineering Workshop. The objective of the Joint Workshop is to promote cooperation, collaboration and networking between the two societies and their members of the Korea Society of Medical and Biological Engineering (KOSOMBE) and Biomedical Engineering Society (BMES).

This Joint Workshop is planned for two sessions. We will have a total of 9 plenary/invited speakers (including Prof. Roger Kamm in MIT and Prof. Lonnie Shea in Univ. of Michigan) from the U.S. and Korea spanning the two sessions, followed by a dinner reception (“Korean Night”) for all participants.
**OP–Fri–3–1 Auditorium 1**

**Tracks: Cellular and Molecular Bioengineering, Biomechanics**

**Mechanobiology of the Vascular and Nervous Systems**

*Chairs: Patrick Alford, Rhima Coleman*

**4:00 pm**

Antagonism of the Serotonin 2B receptor Prevents Pathologic Biomechanical Remodeling in a Mouse Model of Familial Pulmonary Arterial Hypertension

Nathaniel Bloodworth¹, Erica Carrier¹, James West¹, Alison Schroer¹, Santhi Gladson¹, Sheila Shay¹, Joshua Hutcheson¹, and David Merryman¹

¹Vanderbilt University, Nashville, TN, ²Florida International University, Miami, FL

**4:15 pm**

A Biomimetic Platform Reveals Novel Mechanisms for Regulation of Microvascular Function via Hemodynamic Shear Stress

William Polacheck¹,², Matthew Kutys¹, and Christopher Chen¹

¹Boston University, Boston, MA, ²Harvard University, Boston, MA

**4:30 pm**

Shear Stress Modulates Endothelial VCAM-1 Expression via Endoplasmic Reticulum Stress Response Pathways

Keith Bailey¹, Scott I Simon¹, and Anthony Passerini¹

¹UC Davis, Davis, CA

**4:45 pm**

Shear Stress Modulates Endothelial Cell Glucose Uptake and Endothelial Nitric Oxide Synthase O-GlcNAcylation

Alisa Clyne¹ and Sarah Basehore³

¹Drexel University, Philadelphia, PA

**5:00 pm**

Short-Duration Overpressure Induces Acute Structural Reactivity in Glia

Nora Hlavac¹ and Pamela VandeVord¹,²

¹Virginia Tech, Blacksburg, VA, ²Salem Veterans Affairs Medical Center, Salem, VA

**5:15 pm**

*in Vivo* Diametric Regulation of Single Axons in Drosophila

Anthony Fan¹, Aireza Tofangchi¹, Mikhail Kandel¹, Gabriel Popescu¹, and Taher Saif¹

¹University of Illinois at Urbana-Champaign, Urbana, IL

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**OP–Fri–3–2 Auditorium 2**

**Tracks: Cancer Technologies, Nano and Micro Technologies**

**Heterogenous Cell-Cell Interactions in Cancer**

*Chairs: Mathumai Kanapathipillai, Daniel Gallego-Perez*

**4:00 pm**

Effect of Resident Macrophages on Extravasation of Breast Cancer Epithelial Cells

Marie-Elena Brett¹, Geneva Doak¹, and David Wood¹

¹University of Minnesota, Minneapolis, MN

**4:15 pm**

Microengineered Tumor-Stroma Platform Investigating the Biochemical Influence of Stromal Fibroblasts on Breast Cancer Invasion

Danh Truong¹, Eric Barrientos², Julieann Puleo³, Ghassam Mouneimne⁴, and Mehdi Nikkhah²

¹Arizona State University, Tempe, AZ, ²Arizona State University, Tempe, AZ, ³University of Arizona, Tucson, AZ, ⁴University of Arizona, Tucson, AZ

**4:30 pm**

Single-Cell Functional Analysis of Immune Cell-Mediated Cytotoxicity Against Myeloma in Microfluidic Droplets

Saheli Sarkar¹, Pooja Sabhachandani¹, and Tania Konry¹

¹Northeastern University, Boston, MA

**4:45 pm**

Single Cell Analysis of Contact Inhibition in Micro-Patterned Culture

Khadija Zaidi¹ and Nitin Agrawal¹

¹George Mason University, Fairfax, VA

**5:00 pm**

3D Tumor Model to Investigate Natural Killer Cell-Cancer Cell Interactions

Isaac Adjei¹, Glendon Plumton¹, Julie Djeu², and Blanka Sharma³

¹University of Florida, Gainesville, FL, ²Moffitt Cancer Center, Tampa, FL

**5:15 pm**

Pediatric Glioblastoma Cells Modulate Human Neural Progenitor Cell Phenotype and Migration within Cocultures

Kurt Farrell¹, Moo-Yeal Lee¹, and Chandra Kothapalli¹

¹Cleveland State University, Cleveland, OH
OP–Fri–3–3  Auditorium 3

Track: Biomechanics

Biomechanics of Biomaterials

Chairs: Muralidhar Padala, Jessica Isaacs

4:00 pm
Zonal Articular Cartilage Exhibits Poroelastic Behavior

Joseph Wahlquist¹, Aaron Aziz¹, Mark Randolph², Stephanie Bryant¹, Corey Neu¹, and Virginia Ferguson¹
¹University of Colorado, Boulder, Boulder, CO, ²Harvard Medical School, Boston, MA

4:15 pm
Measurement of Displacement Fields of Native Extracellular Matrix Fibrils Loaded In Situ

Andrea Acuna¹, Michael Drakopoulos¹, Benjamin Sather¹, Craig Goergen¹, and Sarah Calve¹
¹Purdue University, West Lafayette, IN

4:30 pm
Detection of Mechanical Damage at the Molecular Level Using Collagen Hybridizing Peptides

Jared Zitnay¹, Yang Li¹, Zhao Qin², Markus Buehler², S. Michael Yu¹, and Jeffrey Weiss¹
¹University of Utah, Salt Lake City, UT, ²Massachusetts Institute of Technology, Cambridge, MA

5:00 pm
Creep Properties of Pelvic Floor Supportive Ligaments

Adwoa Baah-Dwomoh¹, Ting Tan¹, and Raffaella De Vita¹
¹Virginia Tech, Blacksburg, VA

5:15 pm
Sensitivity to Axial Rotation and Region-of-Interest Selection in Bone Mineral Density at the Lateral Distal Femur

Jodie Gomez¹, Rachel Tufaro¹, Ashkan Pourkand², David Grow², and Christina Salas¹
¹University of New Mexico, Albuquerque, NM, ²New Mexico Institute of Mining and Technology, Socorro, NM

OP–Fri–3–4  Room 102AB

Track: Cardiovascular Engineering, Tissue Engineering

Cardiovascular Tissue Engineering IV

Chairs: Lauren Black III, Megan McCain

4:00 pm
Heart-on-a-Plate for Drug Discovery and Disease Modeling—INVITED

Milica Radisic¹
¹University of Toronto, Toronto, ON, Canada

4:30 pm
Dissecting The Mechanisms Of Genetic Cardiomyopathy Using In Vitro Engineered Disease Models

Anant Chopra¹, Mathew Kutys¹, Kehan Zhang¹, William Polacheck¹, J. G. Seidman², Christine Seidman², John Hinson³, and Christopher S. Chen¹ ¹Bostons University, Boston, MA, ²Harvard Medical School, Boston, MA, ³University of Connecticut Health Center & The Jackson Laboratory for Genomic Medicine, Farmington, CT, ¹Harvard University, Boston, MA

4:45 pm
Construction of Engineered Myocardium by the Cultivation of Induced Pluripotent Stem Cells within Bio-inspired Hydrogel Consisting of Self-assembled Peptides

Yujian Huang¹, Lei Wang², Tao Yue¹, Lening Sun¹, Hua Zhu³, Yigang Wang², Peter Mohler³, and Mingjun Zhang¹
¹The George Washington University, Washington, DC, ²Washington University in St. Louis, St. Louis, MO

5:00 pm
Maturation of Human Pluripotent Stem Cell-Derived Cardiomyocytes by Engineering 3D Cardiac Tissues

Tracy Hookway¹, Nik Mendoza-Camacho¹, and Todd McDevitt¹ ¹Gladstone Institutes, San Francisco, CA, ²University of California San Francisco, San Francisco, CA

5:15 pm
Acute and Chronic Stimulation of 1-Adrenergic Receptor have Opposite Effect on Electrical Activity in Human Ventricular Slices

Chaoyi Kang¹, Yun Qiao², Gang Li², Stacey Rentschler², and Igor Efimov²
¹The George Washington University, Washington, DC, ²Washington University in St. Louis, St. Louis, MO
OP–Fri–3–5
Track: Biomaterials*
BMES 2016 | Minneapolis

OP–Fri–3–6
Track: Cellular and Molecular Bioengineering

* Biomaterials Track sponsored by
ACS Biomaterials Science & Engineering
Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3

4:30 pm
Mechanical Phenotyping of Inflammatory Breast Cancer Stem Cells
Weiyi Qian1, Qiabin Wang2, Xiaoyu Xu3, and Weiqiang Chen1
1New York University, Brooklyn, NY

4:45 pm
A Stiff Microenvironment Induces Multinucleation Downstream of MMP3, Snail, and Cell-Cell Fusion
Allison Simi1, Tiffany Ha1, Derek Radisky2, and Celeste Nelson1
1Princeton University, Princeton, NJ, 2Mayo Clinic Cancer Center, Jacksonville, FL

5:00 pm
Genomic Variation Across Cancers Scales with Matrix Density and Stiffness
Charlotte Pfeifer1, Jerome Irianto1, and Dennis Discher1
1University of Pennsylvania, Philadelphia, PA

5:15 pm
Using Optical Manipulation To Determine Mechanical Forces In Normal And Tumor Microenvironments In Vivo—INVITED
Kandice Tanner1
1NCI/NIH, Bethesda, MD

OP–Fri–3–8
Room 101C

Tracks: Biomechanics, Tissue Engineering

Biomechanics in Cell and Tissue Engineering

Chairs: Muralidhar Padala, Andrew Kemper

4:00 pm
Erythrocyte Aggregation by Oxygen Nanobubble Interactions during the Onset of Thermal Burn Injury
Harrison Seidner1, Samantha WeberFishkin1, Semih Kuric1, Geoffry Gunter2, and Mary Frame1
1Stony Brook University, Stony Brook, NY, 2Arete Associates, Los Angeles, CA

4:15 pm
Shear Stress Enhances Human iPSC Differentiation to Brain Endothelial Cells via P21 Signaling
Tongcheng Qian1, Eric Shusta1, and Sean Palecek1
1UW-Madison, Madison, WI

4:30 pm
Tension Generation and Wound Healing in Human Dermal Equivalents
Ting-Wei Law1, Lauren Tinnin1, Melville Vaughan1, and Gang Xu1
1University of Central Oklahoma, Edmond, OK

4:45 pm
Characterizing Physical Properties of Injectable PEG-Fibrinogen Nitric Oxide Releasing Hydrogels
Hannah Fisher1, Carly Joseph2, Breena Spalding2, Leslie Lalonde2, Connor McCarthy2, and Rupak Rajachar2
1Michigan Technological University, Mattawan, MI, 2Michigan Technological University, Houghton, MI

5:00 pm
Age and Location-Dependent Variation of Trabecular Length and Trabecular Number per Connection in Human Calcanei
Annalisa De Paolis1, Sam Tran3, and Luis Cardoso1
1The City College of New York, New York, NY

5:15 pm
Computational Modeling of Collective Cell Migration on a Viscoelastic ECM Fiber Network
Min-Cheol Kim1, Michaealle Mayalu1, and H. Harry Asada1
1Massachusetts Institute of Technology, Cambridge, MA

OP–Fri–3–9 Room 101D

Tracks: Tissue Engineering, Nano and Micro Technologies

Organ-on-Chip Models for Study of Disease and Drug Discovery II

Chairs: Guohao Dai, Jason Gleghorn

4:00 pm
Development of Transparent Ultrathin Membranes for Cellular Barrier and Co-Culture Models
Robert Carter1, Stephanie Casillo1, Andrea Mazzocchi1, and Thomas Gaborski1
1Rochester Institute of Technology, Rochester, NY

4:15 pm
Human Skin-on-a-Chip: A Microengineered Biomimetic Model for Studies in Skin Mechanobiology
Megan Farrell1, Thomas Seykora1, Jeongyoun Seo2, and Dongeun Huh1
1University of Pennsylvania, Philadelphia, PA

4:30 pm
A Biomimetic on-Chip Model to Reconstitute Lymphedema
Esak Lee1,2, William J. Polacheck1,2, Duc-Huy T. Nguyen1,2, Stella Alimperti1,2, and Christopher S. Chen1,2
1Boston University, Boston, MA, 2Wyss Institute at Harvard University, Boston, MA

4:45 pm
Comprehensive Investigation of Endothelial Specializations for Physiologically Relevant BBB Models
Candice Hovell1, Yoshitaka Sei1, Song I.-H. Ahn1, Cole Weiler1, Jiwon Yom3, Gilda Barabino3, Lakeshia Taite3, and YongTae Kim1
1Georgia Institute of Technology, Atlanta, GA, 2City College of New York, New York, NY, 3Texas A&M University, College Station, TX

5:00 pm
A Microtissue System Model of Angiogenesis in the Endometrium
Mahama Traore1, Jessica Lin1, Venkatesh Shirure1, Susan Olalekan1, Julie Kim1, Teresa Woodruff2, and Steven George1
1Washington University in Saint Louis, Saint Louis, MO, 2Northwestern University, Chicago, IL
5:15 pm

**An In Vitro Chondro-Osteo-Vascular Triphasic Model of The Osteochondral Complex**

Riccardo Gottardi1,2, Alessandro Pirosa1,3, Peter Alexander1, Paul Manner1, Dario Puppi1, Federica Chiellini1, and Rocky Tuan1

1University of Pittsburgh, Pittsburgh, PA, 2Ri.MED Foundation, Palermo, Italy, 3Università degli Studi di Pisa, Pisa, Italy, 4University of Washington, Seattle, WA

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* Biomaterials Track sponsored by

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OP-Fri-3-10

Room 101E

**Track: Biomaterials**

**Natural and Bioinspired Materials II**

Chairs: Vivek Gupta, Ho-Wook Jun

4:00 pm

**Tunable Nitric Oxide Release from SNAP via Catalytic Copper Nanoparticles for Enhanced Antibacterial Properties of Polymeric Biomaterials**

Jitendra Pant1, Marcus Goudie1, Elizabeth Brisbois2, Sean Hopkins1, and Hitesh Handa1

1University of Georgia, Athens, GA, 2University of Michigan, Ann Arbor, MI

4:15 pm

**Fibronectin Fiber Extrusion Via Silk-inspired Shear Spinning**

Matthew Jacobsen1, Shannon Anderson1, Joyce Wong1, and Michael Smith1

1Boston University, Boston, MA

4:30 pm

**Deposition Conversion Approach for Selectively Synthesized Apatite Coatings On Biopolymer Hydrogels**

Jacqueline Harding1 and Melissa Krebs1

1Colorado School of Mines, Golden, CO

4:45 pm

**Collagen-Mimetic Proteins with Tunable Integrin Binding Sites for Vascular Graft Coatings**

Juan Felipe Diaz Quiroz1, Patricia Diaz Rodriguez1, Tanzil Islam1, Monty Reichert1, Magnus Högglund1, and Mariah S. Hahn1

1Center for Biotechnology and Interdisciplinary Studies, Rensselaer Polytechnic Institute, Troy, NY, 2Department of Biomedical Engineering, Duke University, Durham, NC, 3Institute of Biosciences and Technology, Texas A&M Health Science Center, Houston, TX

5:00 pm

**Collagen Methacrylamide For Simple, Free-Form Fabrication Of Customized, Fibrillar Scaffolds**

Kathryn Drzewiecki1, Ijaz Ahmed1, and David Shreiber1

1Rutgers, The State University of New Jersey, Piscataway, NJ

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OP-Fri-3-11

Room 200E

**Track: Neural Engineering**

**Neural Cell Model Systems**

Chairs: Tay Netoff, Erkin Seker

4:00 pm

**Electrical Stimulation Enhances M2 Macrophage Phenotype**

Kathryn Kearns1 and Deanna Thompson1

1Rensselaer Polytechnic Institute, Troy, NY

4:15 pm

**Microelectrode Array Analysis of Neuroprotection after Glutamate-induced Excitotoxicity**

Kate O’Neill1 and Bonnie Firestein1

1Rutgers University, Piscataway, NJ

4:30 pm

**Engineering 3-D Neural Organoid Morphology Using PVOH-Ca Sacrificial Templates**

Carlos Marti-Figueroa1,2, Jason McNulty1,2, Joshua Plantz1,2, Lih-Sheng Turng1,2, and Randolph Ashton1,2

1University of Wisconsin-Madison, Madison, WI, 2Wisconsin Institute for Discovery, Madison, WI

4:45 pm

**A Microfluidic Platform for Dopaminergic Neuron Differentiation and In Situ Dopamine Uptake Measurements**

Yue Yu1 and Aaron Wheeler1

1University of Toronto, Toronto, ON, Canada

5:00 pm

**A Culture Platform to Assess Responses of Isolated Ventral Spinal Populations to Extracellular Cues**

Nisha Iyer1 and Shelly Sakiyama-Elbert1

1Washington University in St. Louis, Saint Louis, MO

5:15 pm

**Self-Rolled-Up 3D Microtube Arrays Enhance Alignment of Hippocampal Neurons in Synthetic Circuits**

Olivia V. Cangellaris1, Elise A. Corbin1,2, Paul Froeter1, Xiuling Li1, and Martha U. Gillette1

1University of Illinois at Urbana-Champaign, Urbana, IL, 2University of Pennsylvania, Philadelphia, PA
Friday, October 7 | 4:00 pm–5:30 pm | Platform Session 3

OP–Fri–3–12  Room 200F
Track: Cellular and Molecular Bioengineering
CMBE Young Innovators II

Chairs: Tejal Desai, Daniel Hammer, Michael King

4:00 pm
Predictive Model of Lymphocyte-specific Protein Tyrosine Kinase (LCK) Autoregulation—INVITED
Jennifer Rohrs1, Pin Wang1, and Stacey Finley1
1University of Southern California, Los Angeles, CA

4:15 pm
Oncogene Knockdown via Active Loading of Small RNAs into Extracellular Vesicles by Sonication—INVITED
Tek Lamichhane1, Anjana Jeyaram1, Divya Patel1, Babita Parajuli1, Natalie Livingston1, Navein Arumugasaamy1, John Schardt1, and Steven Jay1
1University of Maryland, College Park, MD

4:30 pm
Mechanical Properties of The Tumor Stromal Microenvironment Probed Ex Vivo By In Situ Calibrated Optical Trap-Based Active Microrheology—INVITED
Kandice Tanner1
1NCI/NIH, Bethesda, MD

4:45 pm
Evolution of Local and Systemic Immunity after Targeted Programming of the Lymph Node Environment—INVITED
Christopher Jewell1,2,3
1University of Maryland, College Park, MD, 2University of Maryland Medical School, Baltimore, MD, 3Marlene and Stewart Greenebaum Cancer Center, Baltimore, MD

5:00 pm
Co-assembly Tags Based on Charge Complementarity (CATCH) for Installing Functional Protein Ligands into Supramolecular Biomaterials—INVITED
Dillon Seroski1, Antonietta Restuccia1, Anthony Sorrentino1, Kevin Knox1, and Gregory Hudalla1
1University of Florida, Gainesville, FL

4:15 pm
Meta-Proteomic Analysis for the Clinic: A Guide Towards Personalized Therapy in Leukemia
Chenyue Hu1, Steven Kornblau2, and Amina Qutub1
1Rice University, Houston, TX, 2MD Anderson Cancer Center, Houston, TX

4:30 pm
Metabolic Interaction Profiling of a Complete Murine Gut Microbiota
Matthew Biggs1, Gregory Medlock1, Thomas Moutinho1, Hannah Lees2, Jonathan Swann2, Glynis Kolling1, and Jason Papin1
1University of Virginia, Charlottesville, VA, 2Imperial College, London, United Kingdom

4:45 pm
A Sensitive High-throughput Assay Platform for Quantifying Nucleo-cytoplasmic Phosphatase Activity
Millie Shah1 and Kevin Janes1
1University of Virginia, Charlottesville, VA

5:00 pm
Comparative Mapping of Dengue Virus-Host Interactions Using Systems Biology Approaches
Priya Shah1, Gwendolyn Jang1, Jeffrey Johnson1, John Von Dollen1, Billy Newton1, Laura Satkamp1, Mark Kunitomo1, Federico de Maio2, Ana Fernandez-Sesma3, Andrea Gamarnik2, Raul Andino1, and Nevan Krogan1
1UCSF, San Francisco, CA, 2Leloir Institute, Buenos Aires, Argentina, 3Mount Sinai School of Medicine, New York, NY

5:15 pm
Molecular Network Modeling of Drug-induced Cardiotoxicity in Space of Dose and Time
Huan Wang1,2, Adam Palmer3, Sarah Boswell3, Robert Everley3, and Peter Sorger1
1Harvard Medical School, Boston, MA, 2Harvard Institute of Therapeutic science, Boston, MA, 3Harvard Institute of Therapeutic science, Boston, MA

OP–Fri–3–13  Room 200D
Track: Stem Cell Engineering
Technologies for Stem Cell Engineering

Chairs: Hossein Tavana, Marsha Rolle

4:00 pm
Hierarchical Fabrication of Biomimetic Vascularized Tissue Constructs via Dual 3D Bioprinting and Regional Immobilization—INVITED
Haitao Cui1,2, Adam Palmer3, Sarah Boswell3, Robert Everley3, and Peter Sorger1
1Harvard Medical School, Boston, MA, 2Harvard Institute of Therapeutic science, Boston, MA, 3Harvard Institute of Therapeutic science, Boston, MA
4:30 pm
Hydrogels for Light-Triggered siRNA Release for Guiding hMSC Osteogenesis
Minh Khanh Nguyen1, Cong Truc Huynh1, Mantas Naris1, Gulen Tonga2, Vincent Rotello2, and Eben Alsberg3
1Case Western Reserve University, Cleveland, OH, 2University of Massachusetts, Amherst, MA

4:45 pm
Osteogenic Differentiation of Human Mesenchymal Stem Cell in Response to Biomaterial Properties is Inhibited by Selective Serotonin Reuptake Inhibitors
Nancy Ayad1, Kelly Hotchkiss1, and Rene Olivares-Navarrete1
1Virginia Commonwealth University, Richmond, VA

5:00 pm
Engineering Xeno-Free Microcarriers for Human Pluripotent Stem Cell Bioprocessing
Fan Zhang1, Yongjia Fan1, and Emmanuel Tzanakakis1,2
1Tufts University, Medford, MA, 2Tufts Medical Center, Boston, MA

5:15 pm
Fabrication of Injectable Hydrogel Microspheres for Delivery of Encapsulated Equine Endothelial Progenitor Cells
Wen Seeto1, Yuan Tian1, Randolph Winter1, Fred Caldwell2, Anne Wooldridge1, and Elizabeth Lipke1
1Auburn University, Auburn, AL

4:00 pm
Effect of Exercise Therapy on Supraspinatus Tears During Internal-External Rotation
Gerald Ferrer1, R Matthew Miller1, Jason Zlotnicki1, Scott Tashman1, Volker Musahl1, and Richard E Debski1
1University of Pittsburgh, Pittsburgh, PA

4:15 pm
Ataxic Horses Differ Significantly From Sound Horses In Their Distal Limb Acceleration At A Walk
Megan Aanstoos1, Birgitte Luining2, Jeremiah Easley1, and Yvette Nout-Lomas1
1Colorado State University, Fort Collins, CO, 2Utrecht University, Utrecht, Netherlands

4:30 pm
Severe Unilateral Hip Osteoarthritis Alters Hip and Ankle Power Bilaterally During Walking
Robin Queen1 and Daniel Schmitt2
1Virginia Tech, Blacksburg, VA, 2Duke University, Durham, NC

4:45 pm
H-Taping Method for Prophylactic or Temporary Fixation of A2 Pulley Tears During Rock Climbing
Rachel Tufaro1, Alexander Telis1, Dustin Larson1, Deana Mercer1, and Christina Salas1
1University of New Mexico, Albuquerque, NM

5:00 pm
Aging Effects On Muscle-Tendon Interaction Dynamics During Cyclic Contractions in a Rat Model
Jonathan Doering1 and Gregory Sawicki1
1NCSU, Raleigh, NC

5:15 pm
Head Kinematics in Human Body Models Of Increasing Complexity vs. Volunteer Data In Frontal Impacts
William Decker1, Bharath Koya1, Matthew Davis1, and F. Scott Gayzik1
1Wake Forest University, Winston-Salem, NC

OP–Fri–3–15 Room 200C
Track: Biomechanics
Biomechanics of Rehabilitation/Injury

4:00 pm
Effect of Exercise Therapy on Supraspinatus Tears During Internal-External Rotation
Gerald Ferrer1, R Matthew Miller1, Jason Zlotnicki1, Scott Tashman1, Volker Musahl1, and Richard E Debski1
1University of Pittsburgh, Pittsburgh, PA

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Head Kinematics in Human Body Models Of Increasing Complexity vs. Volunteer Data In Frontal Impacts
William Decker1, Bharath Koya1, Matthew Davis1, and F. Scott Gayzik1
1Wake Forest University, Winston-Salem, NC

OP–Fri–3–16 Room 200H
Track: Drug Delivery
Delivery Systems for Proteins and Vaccines

4:00 pm
Vaccination with Poly(Mannose)-antigen Conjugates Combined with a Novel TLR7 Agonist Enhances Cellular Immune Response
Scott Wilson1, Sachiko Hirose1, Melody Swartz2, and Jeffery Hubbell2
1EPFL, Lausanne, Switzerland, 2University of Chicago, Chicago, IL

4:30 pm
Delivering Nucleic Acid Adjuvants with Nanoparticle Vaccines to Stimulate Pulmonary Immunity
Frances C. Knight1, Pavlo Gilchuk1, Sema Sevimli1, Sebastian Joyce1, and John T. Wilson1
1Vanderbilt University, Nashville, TN

4:45 pm
Controlled Release of Thermostabilized Inactivated Polio Vaccine from PLGA-Based Microparticles
Stephey Tzeng1, Rohiverth Guarecuco1, Kevin McHugh1, Evan Rosenberg1, Yingying Zeng1, Sviatana Rose1, Robert Langer1, and Ana Jaklenec1
1Massachusetts Institute of Technology, Cambridge, MA

5:00 pm
Microneedle-Assisted Microfluidic Platform for Efficient Intracellular Delivery
Weiqian Jiang1, Mingqiang Li1, Yeh-Hsing Lao1, and Kam Leong1
1Columbia University, New York, NY

5:15 pm
Mucoadhesive Polymer Wafers for Preservation and Sublingual Delivery of Vaccines
Samuel Hanson1, Shailbala Singh2, Jagannadha Sastry2, Michael Barry3, and Chun Wang1
1University of Minnesota, Minneapolis, MN, 2MD Anderson Cancer Center, Houston, TX, 3Mayo Clinic, Rochester, MN
OP–Fri–3–17
Track: Orthopaedic and Rehabilitation Engineering
Skeletal Muscle, Ligaments and Tendons

Chairs: Nelly Andarawis-Puri, Vincent Wang

4:00 pm
Quantitative Muscle Force Measurement using Intramuscular Pressure—INVITED
Kenton Kaufman¹, Shanette Go¹, Shawn O’Connor², Benjamin Wheatley³, William Litchy⁴, Tammy Haut Donahue⁵, Gregory Odegard⁶, Samuel Ward⁷, and Richard Lieber⁸
¹Mayo Clinic, Rochester, MN, ²University of California-San Diego, La Jolla, CA, ³Colorado State University, Fort Collins, CO, ⁴Michigan Technological University, Houghton, MI, ⁵Rehabilitation Institute of Chicago, Chicago, IL

4:30 pm
Gluteus Maximus Activation during Ambulation in Children and Young Adults with Osteogenesis Imperfecta
Jessica Fritz¹, Peter Smith², and Gerald Harris¹
¹Marquette University/Medical College of Wisconsin, Milwaukee, WI, ²Shriners Hospitals for Children, Chicago, IL

4:45 pm
Effect of Sarcolemma Water Permeability on Muscle DTI Measures Following Exercise
Noel Naughton¹ and John Georgiadis¹,²
¹University of Illinois at Urbana Champaign, Urbana, IL, ²Illinois Institute of Technology, Chicago, IL

5:00 pm
Brown and Beige Fat Promote Rotator Cuff Muscle Regeneration through Paracrine Signaling
Anna Bryniarski¹ and Gretchen Meyer¹
¹Washington University in St. Louis, St. Louis, MO

5:15 pm
Knockout of Hyaluronan Synthases Differentially Alters Viscoelastic Properties of Mouse Achilles and FDL Tendons
Kristen Renner¹, Katie Trella², John Sandy², Anna Plaas², and Vincent Wang¹
¹Virginia Tech, Blacksburg, VA, ²Rush University Medical Center, Chicago, IL

OP–Fri–3–18
Track: Biomaterials*
Drug Delivering Biomaterials II

Chairs: Young-sup Yoon, Tara Deans

4:00 pm
Nitric Oxide Releasing Nanomatrix to Enhance Dialysis Fistula Maturation
Patrick Hwang¹, Grant Alexander¹, Maheshika Somaratna², Maggie Collier², Brigitta Brot'r¹,², Jennifer Pollock², Timmy Lee², and Ho-Wook Jun¹,²
¹Endomimetics, LLC, Birmingham, AL, ²University of Alabama at Birmingham, Birmingham, AL

4:15 pm
Simple Chemical Modification Reduces Acute Systemic Toxicity and Improves Tissue Penetration of Polysaccharide Nanoparticles
Randall Toy¹, Pallab Pradhan², Nelson Di Paolo², Vijayeetha Ramesh¹, Yoshitaka Sei¹, YongTae Kim¹, Dmitry Shayakhmetov³, and Krishnendu Roy¹
¹Georgia Institute of Technology, Atlanta, GA, ²Emory University, Atlanta, GA

4:30 pm
Linking Micelle Properties of PEO-PPO-PEO Block Copolymers with Preventing Protein Aggregation
Michael Poellmann¹, Colin Mcfaul¹, and Raphael Lee¹
¹University of Chicago, Chicago, IL

4:45 pm
Engineering Polymeric Biomaterials for Controlled Release: Therapeutic Contact Lenses for Glaucoma Treatment
Liana Wuchte¹, Kacie Carlin¹, Freha Tahir¹, Robert Mosley¹, and Mark Byrne¹
¹Rowan University, Glassboro, NJ

5:00 pm
Development of Stable, Multivalent Protein-Conjugated GNPs as Viral Entry Inhibitors
Allison Siehr¹, Bin Xu¹, Ronald Siegel¹, and Wei Shen¹
¹University of Minnesota, Minneapolis, MN

5:15 pm
Macro-porous Phantom for Improved In Vitro-In Vivo Correlation for Mock Drug Release Kinetics for In Situ Forming Polymer Implants
Selva Jeganathan¹, Christopher Hernandez¹, Natalia Gawlik¹, and Agata Exner¹
¹Case Western Reserve University, Cleveland, OH

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering
Op-Fri-3-19

Room 200J

Track: Cardiovascular Engineering

Heart Valve Structure, Function and Disease II

Chairs: Lakshmi Dasi, Kristen Billiar

4:00 pm

Patient-Specific CFD of Clinical Mitral Regurgitation as a Novel Method to Quantify Regurgitation Severity

Muhammad Jamil, Omar Ahmad, Kian Keong Poh, and Choon Hwai Yap

1 National University of Singapore, Singapore, Singapore, 2Comsats Institute of Information Technology Islamabad, Pakistan, Islamabad, Pakistan, 3Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

4:15 pm

Effect of Averaging the Extracellular Matrix Fiber Structural Network on the Mechanical Responses of the Tricuspid Valve Leaflets

Vineet S. Thomas, Anup D. Pant, Keyvan Amini-Khoiy, and Rouzbeh Amini

1 The University of Akron, Akron, OH

4:30 pm

Physiologically Relevant Effects of Fluid Pulsatility on Engineered Valve Tissue Growth

Alex Williams, Manuel Perez, Arash Moshkforoush, Manuel Salinas, Omkar Mankame, Nikolaos Tsoukias, and Sharan Ramaswamy

1 Florida International University, Miami, FL

4:45 pm

Linking Cell Deformation to Biosynthetic Response: Implications for Mitral Valve Repair

Salma Ayoub, Chung-Hao Lee, Kathryn Driesbaugh, Wanda Anselmo, Connor Hughes, Giovanni Ferrari, and Michael Sacks

1 The University of Texas at Austin, Austin, TX, 2University of Pennsylvania, Philadelphia, PA

5:00 pm

Age-Related Changes in the Extracellular Matrix of Human Aortic Heart Valves

Heather Hutson, Taylor Marohl, Matthew Anderson, Kevin Eliceiri, Paul Campagnola, and Kristyn Masters

1 University of Wisconsin, Madison, WI

5:15 pm

Patient-specific Computational Modeling of Edge-to-Edge Mitral Valve Repair with MitraClip

Fanwei Kong, Thuy Pham, Charles Primiano, John Elefteriades, and Wei Sun

1 Georgia Institute of Technology, Atlanta, GA, 2Hartford Hospital, Hartford, CT, 3Yale Hospital, New Haven, CT

Meet the Expert

4:00 pm–5:30 pm

Room 204

Collaborations with Industry

Organized by Dr. Jerry S.H. Lee, Deputy Director for Cancer Research and Technology, White House Cancer Moonshot Task Force

Bringing a scientific idea to societal benefit is a time and resource intensive endeavor that may involve a combination of state, federal, non-profit, and for-profit funding. This panel of experts will provide and share experiences of how they have successfully crossed one or more “valleys of death” or helped investigators do so with respective resources.

Panel Members:

• Peter Kuhn, Dean’s Professor of Biological Sciences, Professor of Medicine and Engineering, University of Southern California (USC)

• Sean E. Hanlon, PhD, Associate Director, Center for Strategic Scientific Initiatives (CSSI), Office of the Director, National Cancer Institute, NIH

• Lauren C. Leiman, Senior Director for External Partnerships, White House Cancer Moonshot Task Force

• Syril D. Pettit, Executive Director, Health and Environmental Sciences Institute (HESI)

Special Session

4:00 pm–5:30 pm

Room 200A

Educational Approaches to Best Prepare Students for Industry

Chair: Ben Noe

This panel discussion will be informed by data received from the BMES Industry Survey regarding industry’s needs and perceptions of BME students as potential employees. The session will focus on educational approaches to best prepare biomedical engineering students at both the undergraduate and graduate levels.

Industry Mixer

7:30 pm–8:30 pm

The Local Pub Choir Room

Chair: Ben Noe
## POSTERS

### Posters 397–479

### Posters 305–396

### Posters 213–304

### Posters 145–212

### Posters 528–564

### Posters 504–527

### Posters 528–564

### Posters 565–624

### Posters 1–60

### Posters 121–144

### Posters 97–120

### Poster Viewing with Authors & Refreshment Break | 9:30 am—10:15 am and 3:15 pm—4:00 pm

### Friday, October 7 | 9:30 am–5:00 pm | Poster Session, Exhibit Hall BC | 9:30 am–10:15 am and 3:15 pm–4:00 pm
Fri–7
3D Bioprinting Novel Graphene Oxide Scaffold for Improved Human Bone Marrow Mesenchymal Stem Cell Chondrogenic Differentiation
Xuan Zhou1, Se-jun Lee2, Margaret Nowicki1, and Lijie Zhang1
1The George Washington University, Washington, DC

Fri–8
A Needle-Punch Method to Enhance Cellular Infiltration of Adipose Stem Cells in Allograft Menisci
Rachel Nordberg1, Adisri Charoenpanich1, Christopher Vaughn1, Matthew Fisher1, Jacqueline Cole1, Jeffrey Spang1, and Elizabeth Loboа3
1University of North Carolina Chapel Hill & North Carolina State University, Raleigh, NC, 2University of North Carolina Chapel Hill, Chapel Hill, NC, 3University of Missouri, Columbia, MO

Fri–9
Assessment of Articular Surface Damage by Polarized Reflectance Microscopy and Spectroscopy
Ruby Huynh1, Frances Anne Tosto1, and Christopher Raub1
1The Catholic University of America, Washington, DC

Fri–10
Permeability of Articular Cartilage
Ryan McCulloch1 and Peter Mente2
1Gonzaga University, Spokane, WA, 2UNC/NCSU, Raleigh, NC

Fri–11
The Role of Heat Shock Protein 70 in Chondrogenesis of hMSCs
Chenghai Li1 and Sihong Wang1
1City College of New York, New York, NY

Fri–12
Pain Measures in a Rodent Model of Intervertebral Disc Degeneration
Elizabeth M. Leimer1,2,3, Matthew G. Gayoso1, Taylor L. Comte1, Munish C. Gupta1, and Lori A. Setton1
1Washington University in St. Louis, St. Louis, MO, 2Duke University, Durham, NC, 3Albany Medical College, Albany, NY

Fri–13
Surface Roughness of Metal Orthopedic Implants Alters the Biology of Human Mesenchymal Stromal Cells
Eric Lewallen1, Dakota Jones1, Roman Thaler1, Amel Dudaković, Janet Denbeigh1, Christopher Paradise1, Martina Gluscevic1, Endre Soreide1, Hilal Kremers1, Matthew Abdel1, Robert Cohen1, David Lewallen1, and Andre van Wijnen1
1Mayo Clinic, Rochester, MN, 2Stryker Orthopedics, Mahwah, NJ

Fri–14
Lumbar Bone Mineral Density Measurement and its Clinical Use in Osteopenia Screening and Fracture Prediction
Mona Saffarzadeh1, Ashley Weaver1, Caresse Hightower1, Anna Miller2, Kristen Beaver3, and Joel Stitzel3
1Center for injury Biomechanics, Wake Forest University School of Medicine, Winston Salem, NC, 2Orthopaedic Surgery, Wake Forest University School of Medicine, Winston Salem, NC, 3Health and Exercise Science, Wake Forest University, Winston Salem, NC

Fri–15
Evaluation of Bone Ingrowth Into Orthopedic Implant Surfaces Using an Ex-Vivo Bioreactor System
Rupak Dua1, Hugh Jones1, and Philip Noble1,2
1Institute of Orthopedic Research & Education, Houston, TX, 2Baylor College of Medicine, Houston, TX

Fri–16
Development of Subject-Specific Proximal Femur and Lumbar Spine Finite Element Models of Obese, Older Adults to Evaluate the Effects of Weight Loss on Bone Strength
Samantha School1, Ashley Weaver2, Joel Stitzel3, and Kristen Beavers4
1Virginia Tech- Wake Forest Center for Injury Biomechanics, Winston-Salem, NC, 2Wake Forest University, Winston-Salem, NC

Track: Orthopaedic and Rehabilitation Engineering
Articular Cartilage, Meniscus and Joints

Fri–17
Quantitative Histological Measures of Bone and Synovium Correlate with Behavior in a Rat Model of OA
Heidi Kloefkorn1 and Kyle Allen1
1University of Florida, Gainesville, FL

Tracks: Orthopaedic and Rehabilitation Engineering, Biomechanics
Orthopaedic Mechanobiology and Mechanotransduction

Fri–18
An Insole Device for the Measurement of Foot Plantar Pressure Distribution during a Gait
Ahnryul Choi1, Hyun Woo Jung2, Kyungsuk Lee2, Hyeseon Chae2, and Joung Hwan Muni1
1Sungkyunkwan University, Suwon, Korea, Republic of, 2Rural Development Administration, Jeonju, Korea, Republic of

Fri–19
Qualitative Regional Wear Analysis of Novel 3D-Printed Variable-Hardness Foot Orthotics
Breanne Przestrzelski1, Kyle Walker1, Brian Kaluf1, Nicole Hooks2, W. Dan Ballard3, Tim Pruett1, Steve Hoeffner1, and John DesJardins1
1Clemson University, Clemson, SC, 2Ability Prosthetics & Orthotics, Greenville, SC, 3Upstate Pedorthic Services, Greer, SC, 4Hoeffner Consulting, Easley, SC

Fri–20
Biomechanical Comparison of 5th Metatarsal Jones Fracture Fixation Methods
Aaron Stone1, Steve Zambrano1, Neil Duplantier1, Ronald Mitchell1, Patrick McCulloch2, Joshua Harris2, David Litten2, Kevin Varner2, and Michael Moreno1,2
1Texas A&M University, College Station, TX, 2Orthopedics & Sports Medicine Methodist Research Hospital, Houston, TX
Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm

**Friday, October 7**

**Poster Session—Friday**

**Tracks: Orthopaedic and Rehabilitation Engineering, Tissue Engineering, Musculoskeletal Tissue Engineering**

- **Fri–21**
  New Generation of Dental Implants Coated with Low Cost Biocompatible/Corrosion Resistant Ultrananocrystalline Diamond (UNCD) Coating for Superior Performance
  Orlando Auciello¹, Daniel Olmedo², Maria Gugliemotti², Bhavani Patel³, Isabella Marques³, Fernando Alfar³, Tarik Shokufar³, Carl Takoudis³, Samuel Campbell², Carlí Sukoto³, Mathew Mathew⁴, Andriana Duran⁴, and Pablo Gurman⁵
  ¹University of Texas at Dallas, Richardson, TX, ²University of Buenos Aires, Buenos Aires, Argentina, ³University of Illinois-Chicago, Chicago, IL

- **Fri–22**
  FDM 3D Printed Proprioector for Prosthetic Joint Angle Detection
  Steven Lathers¹ and Jeffrey La Belle¹
  ¹Arizona State University, Tempe, AZ

- **Fri–23**
  Biomechanical Study of Hybrid Screw Configurations of Locking Plate Humeral Midshaft Fracture Fixation with Incorporating of Kryponite™ Bone Cement
  Trung T. Le¹, Ha V. Vu¹, and Lawrence X. Webb²
  ¹Mercer University, Macon, GA, ²Navicent Health Hospital, Macon, GA

- **Fri–24**
  Reproducibility of ZrO2-based Freeze Casting for Biomaterials and Biomedical Implants
  Yajur Maker¹, Steven Naleway¹, Kate Fickas², Marc Meyers², and Joanna McKintrick¹
  ¹University of California, San Diego, La Jolla, CA, ²Oregon State University, Corvallis, OR

- **Fri–25**
  Hydrogels with Conditionally Active Reporters for Studying Stem Cell Chondrogenesis
  Glendon Plumton¹, Alfonso Martin-Pena¹, Glyn Palmer¹, and Blanka Sharma¹
  ¹University of Florida, Gainesville, FL

- **Fri–26**
  Microscale Mechanics of Human Chondrocyte-Seeded Cartilage Constructs
  Jill Middendorf¹, Stephen Kennedy², Sonya Shortkroff³, Caroline Dugopolski¹, Joseph Siemiatskoski², Lena Bartell¹, Itai Cohen¹, and Lawrence Bonassar¹
  ¹Cornell University, Ithaca, NY, ²Histogenics Corporation, Waltham, MA

- **Fri–27**
  Epigenome Editing Protects Human Adipose Derived Mesenchymal Stem Cells from Inflammatory Cytokines While Maintaining their Therapeutic Properties
  Nilofar Farhang¹, Jonathan Brunger², Joshua Stover, Pratiksha Thakore², Charles Gersbach³, Brandon Lawrence¹, Farshid Guilak¹, Lori Setton³, and Robby Bowles³
  ¹University of Utah, Salt Lake City, UT, ²Duke University, Durham, NC, ³Washington University in St. Louis, St. Louis, MO

- **Fri–28**
  Effects of Mild Periodic Heat Shock on Osteogenesis of hMSCs Cultured in PLA-HA Scaffolds
  Kristifor Sunderic¹, Chenghai Li¹, Luis Cardoso¹, and Sihong Wang¹
  ¹City College of New York, New York, NY

- **Fri–29**
  Bone Tissue Regeneration using 3D Printed Microstructure Incorporated with Hybrid Nano Hydrogel
  Dong Nyoung Heo¹, Se-Jun Lee¹, and Lijie Grace Zhang¹
  ¹The George Washington University, Washington, DC

- **Fri–30**
  Satellite Cell Enhancement of Tissue Engineered Muscle Repair Technologies for the Treatment of Volumetric Muscle Loss
  Ellen Mintz¹, Juliana Passipieri¹, Kyle Martin¹, Poonam Sharma¹, and George Christ¹
  ¹University of Virginia, Charlottesville, VA

- **Fri–31**
  Promote Challenged Bone Regeneration by Targeting Endogenous Stem Cells and Signals
  Qingqing Yao¹, Yangxi Liu¹, and Hongli Sun¹
  ¹University of South Dakota, Sioux Falls, SD

- **Fri–32**
  Co-Delivery of Infusion Decellularized Skeletal Muscle with Minced Muscle Autografts Improved Recovery from Volumetric Muscle Loss Injury
  Benjamin Kasukonis¹, John Kim¹, Lemuel Brown¹, Tyrone Washington¹, and Jeff Wolfch¹
  ¹University of Arkansas, Fayetteville, AR

- **Fri–33**
  Juliana Amaral Passipieri¹, Jack Dienes¹, Ellen Mintz¹, Jacqueline Billey¹, Joseph Frank¹, Joshua Glazier¹, Andrew Portell¹, Kacey Marra¹, and George Christ¹
  ¹University of Virginia, Charlottesville, VA, ²University of Pittsburgh, Pittsburgh, PA

- **Fri–34**
  Engineering Rotator Cuff Tendon Grafts using Riboflavin-UVA Crosslinked Human Amniotic Membranes
  Julien Arrizabalaga¹, Jin Li¹, and Matthias Nollet¹
  ¹University of Oklahoma, Norman, OK

- **Fri–35**
  Catechin-Mediated Surface Chemistry for Enhanced Bone Regeneration
  Jung Seung Lee¹, Jong Seung Lee¹, Ki Suk Yang¹, Soohwan An¹, Min Suk Lee¹, Kyuei Lee¹, Haeshin Lee¹, Hee Seok Yang¹, and Seung-Woo Cho¹
  ¹Yonsei University, Seoul, Korea, Republic of, ²Dankook University, Cheonan, Korea, Republic of, ³Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of

- **Fri–36**
  Densified Collagen-Fibril Biomaterials for Craniofacial Bone Tissue Engineering
  Lauren Watkins¹, Russell Main¹,², Marco Bottino¹, and Sherry Voytk-Harbin¹,²
  ¹Purdue University, West Lafayette, IN, ²Purdue University School of Veterinary Medicine, West Lafayette, IN, ³Indiana University School of Dentistry, Indianapolis, IN

- **Fri–37**
  Muscle-macrophage Tissues for Improved Regeneration In Vitro and In Vivo
  Mark Juhas¹, Jean Ye¹, Zohaib Shaikh¹, Ying Qian¹, and Nenad Bursac¹
  ¹Duke University, Durham, NC
POSTER SESSION—FRIDAY

Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm

Tracks: Neural Engineering, Tissue Engineering

Neural Tissue Engineering

Fri–38 Harnessing Cell Substrate Sensing for Effective Scaffold-based Skeletal Muscle Regeneration
Naagarajan Narayanan¹, Chunhui Jiang¹, Chao Wang¹, Shiuhua Kuang¹, and Meng Deng¹
¹Purdue University, West Lafayette, IN

Fri–39 Size Scale Effects in Engineering Skeletal Muscle Tissue Constructs
Onur Aydin¹, Mohamed Elhebeary¹, and Taher Saif¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Fri–40 BMP-2 Overexpressing Mesenchymal Stem Cells in CS Hydrogels for Healing of Critical Bone Defects
Seth Andrews³, Albert Cheng³, Robin Webb¹, Hazel Stevens², Robert Guildberg², Lohtisah Karumbaiah¹, and Steven Stice¹
¹University of Georgia, Athens, GA, ²Georgia Institute of Technology, Atlanta, GA

Fri–41 Magnetically Responsive Hydrogels for Optimizing Growth Factor Delivery in Bone Regeneration
Seyyedeh Zahra Moafi Madani¹, Anne Reisch¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Fri–42 Multifunctional Electroactive Matrices Have the Ability to Promote Muscle Regeneration
Xiaoyan Tang¹, Yusuf Khan¹, and Cato Laurencin¹
¹Institute for Regenerative Engineering, University of Connecticut Health, Farmington, CT

Tracks: Neural Engineering, Nano and Micro Technologies

Fri–43 Functional 3D Nerve Model Generates Signals from Fascicles Detectable with a Microelectrode Array
Wesley Anderson¹, Dale George¹, Alicia Brown¹, Alexander Bosak¹, Bradley Willenberg¹,², and Stephen Lambert¹
¹University of Central Florida College of Medicine, Orlando, FL, ²University of Florida, Gainesville, FL

Fri–44 Combining Electrospun Nanofibers with Cell-encapsulating Hydrogel Fibers for Neural Tissue Engineering
Joseph Corey¹,², Che Chan¹, Christina White¹, Arjun Rastogi¹, Allison Grant¹, Ryan Miller¹, and Keith Duncan¹
¹The University of Michigan, Ann Arbor, MI, ²VA Ann Arbor Healthcare Center, Ann Arbor, MI

Fri–45 Functionalized Rosette Nanotubes as a Scaffold for Neural Regeneration
Marissa Puzan¹, Belete Legesse¹, Hicham Fenniri¹, and Abigail Koppes¹
¹Northeastern University, Boston, MA

Fri–46 3D Bioprinting Nano Scaffolds with Multi-walled Carbon Nanotubes for Improved Nerve Regeneration
Se-Jun Lee¹ and Lijie Grace Zhang¹
¹George Washington University, Washington, DC

Fri–47 Alginate Hydrogel Based Dynamic Neuropilar Method for Designing Neuropilar Networks In Vitro
Sunghoon Joo¹, Seukyoung Song¹, Yoon Sung Nam¹, and Yoonkey Nam¹
¹KAIST, Daejeon, Korea, Republic of

Fri–48 In Vitro 3D Human Innervated Intestinal Tissue Model
Eleana Manousiouthakis¹, Ying Chen¹, and David L. Kaplan¹
¹Tufts University, Medford, MA

Fri–49 The Development of Neurovascular Tissue Culture Model by Coculturing NSCs and ECs in a Microfluidic Device
Hiroyuki Uwamori¹, Yukawa Higuchi¹, and Ryo Sudo¹
¹Keio University, Yokohama, Japan

Fri–50 3D Gelatin Conduits for Differentiation of Mesenchymal Stem Cells into Schwann Cell-like Phenotypes
Metin Uz², Melda Buyukoz², Anup Sharma¹, Donald Sakaguchi¹, Sacide Alsyo², and Surya Mallapragada¹
¹Iowa State University, Ames, IA, ²Izmir Institute of Technology, Izmir, Turkey

Fri–51 Peripheral Nerve Repair with Uncoated Magnesium Metal Filaments
Ramakrishna Sharma¹, Priyanka Ruparelia², Lifeng Zhang², Dennis LaJeunesse³, and Shyam Aravamudhan¹
¹North Carolina A&T State University, Greensboro, NC, ²University of North Carolina at Greensboro, Greensboro, NC

Fri–52 Increased Cellular Function and Guidance on Electropun Aligned Cellulose Acetate Nanofibers
Sarah Pixley¹, Kevin Little¹, Tracy Hopkins¹, and David Hom¹
¹University of Cincinnati, Cincinnati, OH, ²Cincinnati Children’s Hospital Medical Center, Cincinnati, OH

Fri–53 Understanding The Functional Role of Eph Receptor Clustering in Neurogenesis
Chun Yang¹ and David Schaffer¹
¹University of California, Berkeley, Berkeley, CA

Fri–54 Patterned Optical Stimulation of Cultured Neuronal Networks for Gold-nanorod Based Neural Inhibition Technique
Hyunjun Jung¹ and Yoonkey Nam¹
¹KAIST, Daejeon, Korea, Republic of

Fri–55 Projection Printing Shape Memory Polymer-Based Implantable Neural Interface Devices
Jennifer Burns¹, Lucero Ramirez¹, Aldo Garcia-Sandoval¹, Jonathan Reeder¹, Romil Modi¹, Alexandra Joshi-Imre¹, and Walter E. Voit¹
¹The University of Texas at Dallas, Richardson, TX

Fri–56 Flexible 3D Carbon Nanotubes Cuff Electrode for Functional Electrical Stimulation
Wenwen Yi¹, Chaoyan Chen¹, Pan Tian², Yang Zhou¹, Jie Hu², John Cavanaugh¹, and Mark Ming-Cheng Cheng¹
¹Wayne State University, Detroit, MI, ²Shanghai Jiao Tong University, Shanghai, China, People’s Republic of

Fri–57 Non-Viral Gene Delivery to Peripheral Nerve through a Nanostructured Chip Platform
Natalia Higuita Castro¹, Christopher Wier¹, Jordan Moore¹, Alec Sunyecz¹, Chandan Sen¹, Jose Otero¹, Stephen Kolb¹, and Daniel Gallego-Perez¹
¹The Ohio State University, Columbus, OH
Fri–58  Evaluations of Platinum and CNT-MEA Electrodes on Recording EMG as Peripheral Muscular Interfaces
Pan Tian¹, Chaoyan Chen², Wenwen Yi³, Jie Hu¹, Jin Qi¹, Yang Zhou², Yousef Alshahrani², John Cavanaugh², and Mark Ming-Cheng Cheng³
¹Shanghai Jiao Tong University, Shanghai, China, People’s Republic of, ²Wayne State University, Detroit, MI

Fri–59  Smart Nanoparticles for Anti-Oxidant Delivery into The Brain
Michael Furth¹, Julio Rincon¹, Kyung-An Han¹, and Thomas Bolandi¹
¹University of Texas at El Paso, El Paso, TX

Fri–60  Role of Nanoelectrode Shape and Size on its Ability to Penetrate and Stimulate Single-Cells
Komal Gardê, Jun Yan¹, and Shyam Aravamudhan¹
¹North Carolina A&T State University, Greensboro, NC

Fri–61  Softening Substrate and Encapsulation for Neural Interfaces: Chronic Spinal Cord Stimulators
Aldo Garcia-Sandoval¹, Asht Mishra², Ajay Pal², Alexandra Joshi-Irme³, Adriana C Duran-Martinez¹, Sydney E Sherman¹, Jason B Carmel³, and Walter Voit¹
¹The University of Texas at Dallas, Richardson, TX, ²Burke Medical Research Institute, White Plains, NY

Fri–62  In Vitro Multi-channel Single-unit Recordings of Action Potentials from Mouse Sciatic Nerve
Longtu Chen¹ and Bin Feng¹
¹University of Connecticut, Storrs, CT

Fri–63  Electrochemical Performance Single Material Silicon Carbide (SiC) Electrode
Christopher Frewin¹, Felix Deku¹, Evans Bernardin³, Richard Everly³, Jawad UI Hassan⁴, Erik Janzn³, Joseph Pancrazio¹, and Stephen Saddow⁴
¹University of Texas at Dallas, Richardson, TX, ²University of South Florida, Tampa, FL, ³Nanotechnology Research and Education Center at U.S.F., Tampa, FL, ⁴Linköping University, Linköping, Sweden

Fri–64  CNT-HA Nanofibrous Composite for Neural Electrical Stimulation
Elisabeth Steel¹ and Harini Sundararaghavan¹
¹Wayne State University, Detroit, MI

Fri–65  The Effect of Potassium Chloride on Aplysia Califormica Abdominal Ganglion Activity
fanru fu¹ and Rosalind Sadleir¹
¹University of California, Irvine, CA

Fri–66  Development of Epilepsy-on-a-chip System Based on Microfluidic Perfusion of Organotypic Brain Slice Cultures
Jing Liu¹ and Yevgeny Berdichevsky¹
¹Lehigh University, Bethlehem, PA

Fri–67  Inhibition of the Innate Immunity Pathway of CD14 on Blood-Derived Cells Improves Intracortical Microelectrode Performance
John K. Hermann¹,², Hillary W. Bedell¹,², Madhumitha Ravikumar¹,², Dawn M. Taylor¹,², and Jeffrey R. Capadona¹
¹Case Western Reserve University, Cleveland, OH, ²Louis Stokes Cleveland VA Medical Center, Cleveland, OH, ³Cleveland Clinic, Cleveland, OH

Fri–68  Simulation of Neuronal Localization Using the Utah Multisite Electrode Array
John Mize¹, Mobashir Shandhi¹, and David Warren¹
¹University of Utah, Salt Lake City, UT

Fri–69  Functional Remodeling of Subtype-Specific Markers Surrounding Implanted Neuroprostheses
Joseph Salatino¹ and Erin Purcell¹
¹Michigan State University, East Lansing, MI

Fri–70  Effect of Sieve Transparency on Selectivity of Microsieve Electrodes (µSE) in Recruitment of Peripheral Nerve Axons
Juan Pardo¹, Erik Zellmer¹, Leo Li¹, Matthew MacEwan², Wilson Ray³, and Daniel Moran¹
¹Washington University in St. Louis, St. Louis, MO, ²Washington University School of Medicine, St. Louis, MO

Fri–71  The Effect of Synchronous and Asynchronous Microelectrode Stimulation in The Rat Hippocampus
Mark Conolly¹, Robert Gross¹, and Babak Mahmoudi¹
¹Emory University, Atlanta, GA

Fri–72  5MHz Ultrasound Activates Inner Ear Vestibular Organs
Marta Iversen¹, Douglass Christensen¹, Dennis Parker¹, Micah Fereck¹, Holly Holman¹, and Richard Rabbitt¹
¹University of Utah, Salt Lake City, UT

Fri–73  Characterizing Noise Sources in Flexible, Multiplexed, Capacitive, Active Electrode Arrays
Matthew McCann¹, Jonathan Viventi¹, Michael Trumpis¹, and Ken Chiang¹
¹Duke University, Durham, NC

Fri–74  Tetramethyl Orthosilicate as a Delivery Vehicle for Anti-Inflammatories to Ameliorate the Foreign Body Response Associated with Micro-device Implantation
Matthew McDermott¹,² and Kevin Otto²
¹Purdue University, West Lafayette, IN, ²University of Florida Gainesville, FL

Fri–75  A Self-assembled Bionanomatrix Coating for Intracranial Aneurysm Coils to Enhance Healing
Patrick Hwang¹, Maggie Collier¹, Grant Alexander¹, Brigitta Brott¹,², Robert Hergenrother¹, Ramanathan Kardivel³, David Kallmes³, and Ho-Wook Jun¹,²
¹Endomimetics, LLC, Birmingham, AL, ²University of Alabama at Birmingham, Birmingham, AL, ³Mayo Clinic, Rochester, MN

Fri–76  Low-cost, Compact Neuro-stimulator for Chronic Stimulation of the Rat Retina
Sahar Elyahoodayan¹ and James Weiland¹
¹The University of Texas at Dallas, Richardson, TX

Fri–77  Decoding the Multi-Modal Failures of Microelectrode-Brain Tissue Interface
Takashi Kozai¹
¹University of California, Los Angeles, CA

Fri–78  Viability of a Novel Micro-Electrocorticography Electrode Array Design for Intracranial Implantation in Macaca Mulatta Primary Somatosensory Cortex
Taylor Hearnn¹, Justin Tanner¹, John Lachapelle¹, John Burns IV¹, Juliane Grainger¹, Jonathan Cheng¹, Edward Keefer¹, and Stephen Helms Tillery¹
¹Arizona State University, Tempe, AZ, ²Draper Laboratory, Cambridge, MA, ³Nerves Incorporated, Dallas, TX
Fri–83  On-Chip Data Processing for Large-Scale Neural Recording
Tong Wu¹, Teris Tam¹, and Zhi Yang¹
¹University of Minnesota, Minneapolis, MN

Fri–84  Investigation of Online Incremental Feature Extraction Algorithm for On-Chip Spike Sorting
Wenfeng Zhao¹, Tong Wu¹, and Zhi Yang¹
¹University of Minnesota, Minneapolis, MN

Track: Neural Engineering
Neuroprotective Strategies

Fri–85  Towards a Neuroprotective Abiotic Surface: Resveratrol Incorporation via Surface Adsorbed Hydrogel Particles
Emily Morin¹, Shuangcheng Tang³, and Wei He¹
¹University of Tennessee, Knoxville, TN

Fri–86  In Vitro Modeling of Stroke with Mesenchymal Stem Cells Treatment
Timo Roehrs¹, Rene Schloss¹, and David Shreiber¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Track: Neural Engineering
Noninvasive Neuromodulation

Fri–87  Integration of Transcranial Alternating Current Stimulation and Electroencephalography for the Study of Binocular Rivalry
Abhrajeet Roy¹, Bryan Baxter¹, Chris Cline¹, Sucharit Katyal¹, Steve Engel¹, Sheng He¹, and Bin He¹
¹University of Minnesota, Minneapolis, MN

Fri–88  Finite Element Modeling Predicts Electrophosphene Phenomena in tDCS or tACS Recipients
Aprinda Indahlastari¹, Aditya Kasinadhuni¹, Munish Chauhan¹, Kevin Castellano¹, Malcolm Calvin¹, Gayathri Srinivasan¹, Aditya Pendebackar¹, and Rosalind Sadleir¹
¹Arizona State University, Tempe, AZ, ²University of Florida, Gainesville, FL

Fri–89  Efficient Implementation of EEG Beamformers for Source Detection on Mobile Platforms
Ian Sturdevant¹, Ruben Garcia¹, and Kwong Ng¹
¹New Mexico State University, Las Cruces, NM

Fri–90  Changes in the EEG Spectrum of a Child with Severe Disabilities in Response to Power Mobility Training
Nadina Zweifel¹, Lisa Kenyon¹, John Farris¹, Naomi Aldrich², Paul Stephenson³, and Samhita Rhodes¹
¹Grand Valley State University, Grand Rapids, MI, ²Grand Valley State University, Allendale, MI

Fri–91  A Real Time EEG-Based Neurofeedback Platform for Attention Training
Reza Abiri¹, Xiaopeng Zhao¹, and Yang Jiang¹
¹University of Tennessee, Knoxville, TN, ²University of Kentucky Lexington, KY

Tracks: Bioinformatics, Computational and Systems Biology
Analysis of Cell Signaling

Fri–92  Glucose-Dependence of Renin-Angiotensin System in Podocytes Cells During Diabetic Kidney Disease
Minu Pilvankar¹, Michele Higgins¹, and Ashlee N. Ford Versypt¹
¹Oklahoma State University, Stillwater, OK

Fri–93  Meta-Modeling Reveals that Tyrosine Kinase Receptor Signaling is Primarily Directed by Endocytic Vesicles, Late Endosome, and the Nucleus
Jared Weddell¹ and Princess Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Track: Bioinformatics, Computational and Systems Biology
Computational Approaches in Multicellular Systems

Fri–94  Toward an Individual-Based Model for Bone Remodeling
Estee George¹, Gabrielle Van Scoy², Olivia Petrey³, Dominic Conde¹, Alicia Prieto-Langarica³, and Marnie Saunders¹
¹The University of Akron, Akron, OH, ²Youngstown State University, Youngstown, OH

Track: Biomaterials
Dynamic and Spatially-Patterned Biomaterials

Fri–95  Modulating Cell Migration and Focal Adhesion Dynamics Using Nanotopography
Elena Liang¹, Emma Mah¹, Albert Yee¹, and Michelle Digman¹
¹University of California, Irvine, Irvine, CA

Fri–96  Actuating Patterned Hydrogel for Intestinal Tissue Engineering
Jun-Goo Kwak¹, Abhinav Sharma¹, and Jungwoo Lee¹, ²,³
¹University of Massachusetts Amherst, Amherst, MA, ²Institute for Applied Life Sciences, Amherst, MA, ³Molecular and Cellular Biology Graduate Program, Amherst, MA

Track: Bioinformatics, Computational and Systems Biology
Metabolic Models

Fri–97  Integrative Modeling of Acetone-Butanol-Ethanol (ABE) Fermentation
Chen Liao¹, Seung-Oh Seo¹, Venhar Celik¹,², Huaimei Liu¹, Wentao Kong¹, Yi Wang¹, Hans Blaschek¹, Yong-Su Jin¹, and Ting Lu¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Firat, Elazig, Turkey

Fri–98  Using Genome-Scale Metabolic Models to Study Uncultivated Organisms from the Oral Microbiome
David Bernstein¹ and Daniel Segre¹
¹Boston University, Boston, MA

Fri–99  Predicting the Dynamics of Metabolic Pathways in Pancreatic Ductal Adenocarcinoma
Mahua Roy¹ and Stacey Finley¹
¹University of Southern California, Los Angeles, CA
Fri–100
Mathematical Modeling of the Methylation Cycle In Children With Autism Spectrum Disorder
Troy Vargason¹, Daniel Howsmon¹, Stepan Melnyk², S. Jill James², and Juergen Hahn³
¹Rensselaer Polytechnic Institute, Troy, NY, ²Arkansas Children’s Hospital Research Institute, Little Rock, AR

Fri–101
A Combined Approach for the Real-Time Monitoring of in vitro Bone Tissue Engineered Construct
Aaron Simmons¹, Cortes Williams¹, Kylie M. Foster¹, and Vassilios Sikavitsas¹
¹University of Oklahoma, Norman, OK

Track: Bioinformatics, Computational and Systems Biology
Multiscale Modeling

Fri–102
A Time-varying Biased Random Walk Model of Growth: Application to Height from Birth to Childhood
Bela Suki¹ and Urs Frey²
¹Boston University, Boston, MA, ²University Children’s Hospital Basel, UKBB, University of Basel, Basel, Switzerland

Fri–103
An Image-Based Multiscale Model Predicts Injury-Prone Regions in Cervical Facet Capsular Ligaments
Siija Zhang¹, Vahhab Zarei², Beth Winkelstein³, and Victor Barocas²
¹University of Pennsylvania, Philadelphia, PA, ²University of Minnesota, Minneapolis, MN

Fri–104
New Algorithms to Characterize ET function during Inflammation in Otitis Media Prone Populations
Jennifer Malik¹ and Samir Ghadiali¹
¹University of Oklahoma, Norman, OK

Fri–105
Multiscale Mechanobiology of the Nuclear Pore Complex
Mohammad Mofrad¹
¹University of California Berkeley, Berkeley, CA

Track: Bioinformatics, Computational and Systems Biology
Single-Cell Measurements and Models

Fri–106
Estimating Myofibril Distribution in Adult Cardiomyocytes: A Subcellular Min-Cell Flow Problem
Tyler Harvey¹, Brian Dean², and Delphine Dean¹
¹Clemson University, Clemson, SC

Fri–107
Single Cell Analysis of Bacterial Transcription Reveals Dynamic Induction Response Kinetics
Rebecca Breuer¹, Arpan Bandyopadhyay¹, Sofie O’Brien¹, Aaron Barnes¹, Wei-Shou Hu¹, and Gary Dunny¹
¹University of Minnesota, Minneapolis, MN

Fri–108
Calcium Transfer Between the ER and Mitochondria is Required for Calcium Oscillations in a Model of Sheared Vascular Endothelial Cells
Richard Buckalew¹,², Christopher Scheitzlin¹, Alex Cetnar¹, Arash Moshkforoush¹, Nikolaos Tsoukias¹, and B. Rita Alevriadou¹
¹The Ohio State University, Columbus, OH, ²University of Minnesota Duluth, Duluth, MN, ³Florida International University, Tampa, FL

Track: Systems Approaches to Therapy, Therapeutics, and Precision Medicine

Fri–109
Towards Better Quality in Precision Medicine: A Proposed Framework for Improving Clinical Practice Guidelines with Insights from Mathematical Biology and the Corbin-Strauss Model
Hisham Sherif¹,²
¹Christiana Hospital, Newark, DE, ²University of Delaware, Newark, DE

Fri–110
Systems Modeling of the Contribution of SGLT to Sodium Handling in the Diabetic Kidney
Jessica Boss¹ and Melissa Hallow¹
¹University of Georgia, Athens, GA

Fri–111
A Computational Model of Thrombospondin-1 Apoptotic Mechanisms
Qianhui Wu¹ and Stacey Finley¹
¹University of Southern California, Los Angeles, CA

Fri–112
Accurate and Predictive Profiling of Humoral Immunity by Immunoglobulin Repertoire Sequencing
Sai Reddy¹
¹ETH Zurich, Basel, Switzerland

Fri–113
Predicting Kinase Activities from Phosphoproteomic Measurements
Shweta Ravi¹ and Kristen Naegle¹
¹Washington University in St. Louis, St. Louis, MO

Tracks: Bioinformatics, Computational and Systems Biology, Cellular and Molecular Bioengineering
Theory and Practice of Synthetic Biology

Fri–114
Site Specificity of Affinity Tags Significantly Impact the Folding & Function of Synthetic Peptide
Aby Thyparambil¹,² and Anthony Guiseppi-Elie¹,²
¹Texas A & M University, Bryan, TX, ²Center for Bioelectronics, Biosensors and Biochips (C³B®), Bryan, TX

Fri–115
Reprogramming MHC Specificity by Immunogenomic Cassette Exchange
Sai Reddy¹
¹ETH Zurich, Basel, Switzerland

Fri–116
Expanding the Genetic Toolbox in Synthetic Biology
I Cody MacDonald¹ and Tara Deans¹
¹University of Utah, Salt Lake City, UT

Fri–117
Probing Angiogenesis with Synthetic Biology
Heidi Spears¹, Tyler Page¹, and Tara Deans¹
¹University of Utah, Salt Lake City, UT
Fri–135  
Polyhistidine-Tagged Ligand and Antigen Binding to Cobalt Porphyrin Bilayers  
Shuai Shao¹, Jumin Geng¹, Hyun Yi², Shobhit Gogia¹, Amy Jacobs²,  
Sriram Neelamegham¹, and Jonathan Lovell¹  
¹University at Buffalo, The State University of New-York, Amherst, NY,  
²University at Buffalo, The State University of New-York, Buffalo, NY  

Track: Biomaterials  
Three-Dimensional Printing and Advanced Biomaterial Manufacturing

Fri–137  
3D Bioprinting of Tissue Engineered Aortic Root Scaffolds with Hydrogels  
Benjamin Stewart¹, Shahnaz Javani¹, Debra Wilcox³,  
Corinne Corinne¹, and Ali Azadani¹  
¹University of Denver, Denver, CO  

Fri–138  
3D Printed Brain Model Resembling Mechanical Properties of Brain Matter for Preoperative Planning and Practice  
Miriam Navarro¹, Jorge I Rodriguez Devora¹, and Delphine Dean¹  
¹Clemson University, Clemson, SC  

Fri–139  
Characterization of Stainless Steel and Hydroxyapatite Powders for Additive Manufacturing of Composite Cranio-maxillofacial Implants  
Robert Pack¹, Elizabeth Barker¹, Beth Armstrong³, Claudia Rawn³, and  
Brett Compton¹  
¹The University of Tennessee at Knoxville, Knoxville, TN,  
³Oak Ridge National Laboratory, Oak Ridge, TN  

Fri–140  
Integrating Electrospun Microfibers into 3D Printed Scaffolds for Nerve Regeneration  
Se-Jun Lee¹, Wei Zhu¹, and Lijie Grace Zhang¹  
¹George Washington University, Washington, DC  

Fri–141  
Alginate/gelatin Hydrogels as a Tunable Bioprinting Material for 3D Tumor Studies  
Tao Jiang¹, Jose Gil Munguia-Lopez³, Joel Grant¹,  
Sanahan Vijayakumar¹, and Joseph Kinsella¹  
¹McGill University, Montreal, QC, Canada, ²Instituto Potosino de Investigacion Cientifica y Tecnologica, A.C. (IPICYT), San Luis Potosi, Mexico  

Fri–142  
A Nitrogen-doped Carbon Nanotube and Alginate Composite Hydrogel as a 3D Bioprinting  
Jose Gil Munguia-Lopez¹, Tao Jiang³, Emilio Munoz-Sandoval³,  
Antonio De Leon-Rodriguez², and Joseph Kinsella¹  
¹McGill University, Montreal, QC, Canada, ²Instituto Potosino de Investigacion Cientifica y Tecnologica, A.C. (IPICYT), San Luis Potosi, Mexico  

Fri–143  
3D Printing of Alginated Microstructures with Tunable Degradation Kinetics.  
Thomas Valentin¹, Po-Yen Chen¹, Jaskiranjeet Lodhi¹,  
Marielena Gamboa-Castro¹, Susan Leggett¹, Hayley McClintock¹,  
Shivangi Maddali¹, and Ian Wong¹  
¹Brown University, Providence, RI  

Fri–144  
Evaluation of Carbon Based-Thermoplastic Polyurethane Composites for the Production of 3D Printed Articular Cartilage Scaffold  
Diana Rodriguez¹, Yejin Ji¹, and NamSoo Kim¹  
¹The University of Texas at El Paso, El Paso, TX
Track: Biomaterials

Biomaterial Scaffolds

Fri-145
Growth and Differentiation of Myoblasts on Graphene Foam Scaffolds
Angela Nicole Chang¹, Eric Krueger¹,², Dale Brown¹, Josh Eisenberger¹, Raquel Brown¹, Sepideh Rastegar¹, Kurtis D. Cantley¹, and David Estrada¹
¹Boise State University, Boise, ID, ²Lehigh University, Bethlehem, PA

Fri-146
Computational and Experimental Evaluation of Gradient Scaffolds for Vasculization
Banan Akar¹,², Sami Somo¹,², Chenlin Lu¹, Katerina Stojkova¹, Mustafa Ozturk¹, Elif Bayrak¹, Kenneth Tichauer¹, Ali Cinar¹, and Eric Brey¹
¹Illinois Institute of Technology, Chicago, IL, ²Edward Hines, Jr. V.A. Hospital, Hines, IL

Fri-147
Optimizing Anisotropic Polyurethane Scaffolds to Mechanically Match with the Native Myocardium
Cancon Xu¹,², Yihui Huang¹,², Jinglei Wu¹,², Liao Jun¹,³, Liping Tang¹,², and Yi Hong¹,²
¹University of Texas at Arlington, Arlington, TX, ²University of Texas at Arlington and The University of Texas Southwestern Medical Center at Dallas, Dallas, TX, ³Department of Agricultural and Biological Engineering, Mississippi State University, Mississippi, MS

Fri-148
A Novel Approach to Prepare Nanofibrous 3D Scaffolds
Chi Ma¹, Xiaohua Liu¹, and Chi Ma²
¹Texas A&M University Baylor College of Dentistry, Dallas, TX, ²Texas A&M University Baylor College of Dentistry, Dallas, TX

Fri-149
3D Printed Polymeric Bone Scaffolds Withstand Physiological Loads in the Spine Under Static Loading
Constance Maglaras¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

Fri-150
Focal Adhesion Activation State Drives Cell Migration Velocity Dependence on Matrix Mimetic Nanofiber Diameter
Daniel T. Bowers¹, Mary E. McCulloch¹, and Justin L. Brown⁶
¹The Pennsylvania State University, University Park, PA

Fri-151
Engineering Versatile and Stable Collagen Nanofibers from a Mild Solvent
David Castilla¹ and Jorge Almodovar¹
¹University of Puerto Rico-Mayaguez, Puerto Rico

Fri-152
Novel and Simple Method for Fabrication of Multichannel PLCL Nerve Guidance Conduit
DoYeon Park¹ and Sang-Hoon Lee¹,²
¹KU-KIST Graduate School of Converging Science and Technology, Korea University, Seoul, Korea, Republic of, ²School of Biomedical Engineering, College of Health Science, Korea University, Seoul, Korea, Republic of

Fri-153
Engineered Cellulose-Based Cell Culture Platforms
Gulden Camci-Unal¹
¹Harvard University, Cambridge, MA

Fri-154
Fabrication of the Nano/micro Grooved Scaffold to Mimic the ECM Structure of Nerve Cells for Neural Regeneration
Ji Hong Min¹, Ui Seok Chung¹, Haejeong Pang¹, Hye Jin Hong¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

Fri-155
Strong 1-mm-Diameter Collagen Tubes for Microsurgical Applications
Xuanue Li¹, Jing Xu¹, Calin Nicolescu¹, Jordann Marinelli¹, and Joe Tien¹
¹Boston University, Boston, MA

Fri-156
Electrospun Silk Fibroin Fibrous Scaffolds with Two-stage Hydroxyapatite for Bone Tissue Engineering
Eunkyung Ko¹, Jong Seung Lee¹, Hynryung Kim¹, Kisuk Yang¹, Won Hyoung Ryu¹, and Seung Woo Cho¹
¹Yonsei University, Seoul, Korea, Republic of

Fri-157
A 3-Dimensional Tubular Scaffold for Treating Esophageal Atresia
Jordan Kuiper¹, Jordan Kuiper¹, and Jordan Kuiper¹
¹University of South Dakota, Sioux Falls, SD

Fri-158
FAK Control of MSC Alignment and Spreading on Nanofibrous Substrates
Mohammad Andalibi¹, Jeong Soon Lee¹, Ligyeom Ha¹, Yuris Dzenis¹, and Jung Yul Lim¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri-159
Fabrication and Development of an Electrospun Scaffold to Mimic Bruch’s Membrane as an Approach to Retinal Repair
Ziqian Zeng¹, Phuong Lam¹, Michael Ranidé¹, Christian Gutierrez¹, Michael Robinson¹, Katia Del Rio-Tsonis¹, and Justin Saul¹
¹Miami University, Oxford, OH

Fri-160
Microparticle Scaffolds Support Bone Growth In Vivo
Karolina Stumbraite¹, Ryan Clohessy¹, Barbara D. Boyan¹,², and Zvi Schwartz⁷,³
¹Virginia Commonwealth University, Richmond, VA, ²Georgia Institute of Technology, Atlanta, GA, ³University of Texas Health Science Center at San Antonio, San Antonio, TX

Fri-161
Engineering Extracellular Matrix Biofibers Via Hollow Fiber Membrane Cell Culture
Kevin Roberts¹, Addison Walker¹, Jacob Schluns¹, Jamie Hestekin¹, and Jeffrey Wolchok¹
¹University of Arkansas, Fayetteville, AR

Fri-162
Micropatterned Nickel Titanium Thin Film Scaffold Effect on the Growth of Endothelial Monolayer
Ming Lun Wu¹, Mohanchandra Panduranga¹, and Gregory Carman¹
¹University of California, Los Angeles, Los Angeles, CA

Fri-163
Cytocompatibility of Porous Magnetic Nanocomposites with BMSCs
Naiyin Zhang¹, Andro Azer¹, Jessica Si’i¹, Michael Segura¹, and Jeffrey Wolchok¹
¹University of California, Los Angeles, Los Angeles, CA

Fri-164
Growth Factor Presentation to MSCs within Micro-fiber/ Collagen Composites for Ligament Tissue Engineering
Patrick Thayer¹, Linda Dahlgren¹, and Aaron Goldstein¹
¹Virginia Tech, Blacksburg, VA

Fri-165
Desferoxamine Decorated Nanofibrous Scaffolds Improve Critial-Sized Bone Regeneration
Qingqing Yao¹, Yangxi Liu¹, and Hongli Sun²
¹Biomedical Engineering, University of South Dakota, Sioux Falls, SD, ²Biomedical Engineering, University of South Dakota, Sioux Falls, SD
Fri-166
3D Printed Scaffold Design for Bone Graft Applications Can Withstand Physiological Loading
Rebecca Chung¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

Fri-167
Regulation of The Inflammatory Response to Biodegradable Zinc-Based Implant Materials By Corrosion
Roger Guillory¹, Patrick Bowen¹, Sean Hopkins¹, Emily Shearier¹, Amanee Gillette¹, Eli Aghion², Martin Bocks¹, Jaroslav Drelich¹, and Jeremy Goldman¹
¹Michigan Technological University, Houghton, MI, ²Ben-Gurion University of the Negev, Beer-Sheva, Israel

Fri-168
Photopolymerization of Microgel Building Blocks into Porous Scaffolds for Tissue Engineering
Shangjing Xin¹, Omar Wyman¹, and Daniel Algie¹
¹Texas A&M University, College Station, TX

Fri-169
In-Vitro and In-Vivo Investigation of Chitosan Based Polyelectrolyte-Complex
Shiv Mistry¹, Karishma Desai¹, Jordan Tourneau¹, Rene Schloss¹, and Noah Langrana¹
¹Rutgers University, Piscataway, NJ

Fri-170
Electrospun Conductive PANI/PVDF Blends for Scaffold Engineering
Sameerang Nagaonkar¹, Nastaran Alinezhad¹, Srinivas Kannan¹, and Smitha Rao¹
¹Michigan Tech, Houghton, MI

Fri-171
Design of Peptide Hydrogel for Tissue Infiltration
Daisuke Nakayama¹, Yusuke Kambe², Tetsuya Yamakawa², Sachiro Kakinoki¹, and Yosihaki Hirano¹
¹Kansai University, Osaka, Japan, ²National Cerebral and Cardiovascular Center, Osaka, Japan

Fri-172
3-D culture of Fibroblasts in Superfine Aginate Nanofibrous Membranes
Young Ju Son¹, Wei Mao², and Hyuk Sang Yoo¹
¹Kangwon National University, Chuncheon, Korea, Republic of, ²Kangwon National University, Chuncheon, China, People’s Republic of

Track: Biomaterials
Mechanics of Biomaterials

Fri-173
Effect of DDR2 ECD on Collagen I Gel Mechanics
David Yeung¹, David Gutschick¹, Peter Anderson¹, Heather Powell¹, Gregory Lafiato¹, and Gunjan Agarwal¹
¹The Ohio State University, Columbus, OH

Fri-174
Tough, Degradable, HEMA-Based Hydrogels for Tracheal Replacement
Elizabeth Mansfield¹, Vaughn Greene, Jr¹, and Debra Auguste¹
¹The City College of New York, New York, NY

Fri-175
Time-Dependent Flexural Properties of Human Cortical Bone
Gavriel Feuer¹ and Subrata Saha¹
¹SUNY Downstate, Brooklyn, NY

Fri-176
Analysis of the Effect of Saliva on the Degradation of Absorbable Sutures
Luke Riebing¹, Jenna Bridgel¹, and Donna Ebenstein¹
¹Bucknell University, Lewisburg, PA, ²Geisinger Medical Center, Danville, PA

Fri-177
Thermomechanical Analysis of Thin Shape Memory Polymer Films for Bioelectronic Medicines
Melanie Ecker¹, Vindhya Danda¹, Joseph Pancrazio¹, and Walter Voit¹
¹The University of Texas at Dallas, Richardson, TX

Fri-178
Rheological Differences Between Buffer Dialyzed and Water Dialyzed Keratose Films
Nils Potter¹ and Mark Van Dyke¹
¹Virginia Tech, Blacksburg, VA

Fri-179
Fatigue Characteristics of 3D Printed Scaffold for Long Term Stability in Segmental Bone Defects
Rebecca Chung¹ and Antonio Valdevit¹
¹Stevens Institute of Technology, Hoboken, NJ

Fri-180
Neural Interfaces with Photolithographically-defined, Softening Substrates
Romil Mohi¹ and Walter Voit²
¹University of Texas at Dallas, Dallas, TX, ²University of Texas at Dallas, Richardson, TX

Fri-181
Poly-L-Lactide Fiber Mechanical Properties and Degradation for Bioreabsorbable Stents
T. Welch¹ and Nandika DSouza²
¹UT Southwestern Medical Center of Dallas, Dallas, TX, ²University of North Texas, Denton, TX

Fri-182
The Impact of Sterilization on the Mechanical Properties of Shape Memory Polymers for Bioelectronic Medicines
Vindhya Danda¹, Melanie Ecker¹, Christopher Frewin¹, Andrew Shoffstall², Jeffrey Capadona³, Joseph Pancrazio¹, and Walter Voit¹
¹University of Texas-Dallas, Richardson, TX, ²Case Western Reserve University, Cleveland, OH

Track: Biomaterials

Fri-183
The Role of Ceria and Selenium Nanoparticles in Alleviating Cellular Stress
Amit Roy¹, Ming Gao¹, Carmen Wu², Bo Yuan², and Thomas J. Webster³
¹Northeastern University, Shrewsbury, MA, ²Northeastern University, Boston, MA

Fri-184
Silicone Functionalized with Atomic Layer Deposition: A Novel Material For Antimicrobial Facial Prosthesis
Arghya Kamal Bishal¹, Cortino Sukoto³, and Christos G Takoudis¹
¹University of Illinois at Chicago, Chicago, IL

Fri-185
Stability and Protein Resistance of Silicones Modified with PEO-Silane Amphiphiles
Bryan Khai Ngo¹, Marc Rufin¹, Shane Stafslien², and Melissa Grunlan¹
¹Texas A&M University, College Station, TX, ²University of North Dakota, Fargo, ND

Fri-186
Mesenchymal Transition Of Endothelial And Epithelial Cells On Segmental Polyurethane Elastomers
Calvin Cheah¹, Yusuf Sevcenca¹, Yuan Yuan¹, and Debanjan Sarkar¹
¹University at Buffalo, Buffalo, NY

Fri-187
Cell Propagation on Solvent-Casted Thermoresponsive Film
Kevin Ortiz-Rivera¹, Yonsil Park¹, Wei-Shou Hu¹, and Chun Wang¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Track: Biomaterials
Fri–188
Shrishi Singh¹, Ankarao Kalluri¹, Osama Alturkistani¹, Isaac Macwan¹, Prabir Patra¹, and Ashish Aaphale²
¹University of Bridgeport, Bridgeport, CT, ²University of Connecticut, Storrs, CT

Fri–189
Dynamic Corrosion Behavior of Three Biodegradable Metals (Zn, Fe and Mg) in Phosphate Buffered Saline (PBS)
Yinqi Chen¹,², Weitai Zhang¹, Manfred F. Mairt²,³, Meyun Chen¹, Heng Zhang¹, Jinlong Mao¹, Yuancong Zhao¹, Nan Huang¹, and Guojian Wan¹
¹Key Laboratory of Advanced Technologies of Materials, Southwest Jiaotong University, Chengdu, SC, China, People's Republic of, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ³Leibniz Institute of Polymer Research Dresden, Dresden, Germany

Track: Biomechanics
Advances in Biomechanical Testing of Medical Devices

Fri–190
Biomechanical Effects of the Variation of BMI on Joint Loading during Motorized Disinfection
Tae Soo Bae¹, Sang Hyun Lee¹, Jae Woong Han², and Kyung Hoon Kim³
¹Jungwon University, Chungbuk, Korea, Republic of, ²Korean University, Seoul, Korea, Republic of, ³Hanlim Medical Equipment Co.Ltd, Gyeonggi-do, Korea, Republic of

Track: Biomechanics
Biofluid Mechanics

Fri–191
Flow Dynamics in an Obstructed and Stented Ureter
Dar Weiss¹, Miki Haifler², Harry Winkler², Nir Kleinmann², and Shmuel Einav¹,³
¹Tel Aviv University, Tel Aviv, Israel, ²Chaim Sheba Medical Center, Tel Aviv, Israel, ³Stony Brook, Stony Brook, NY

Fri–192
Longitudinal Comparison of Aortic Flow Variables and Mechanical Stresses in Turner Syndrome
Dhananjay Radhakrishnan Subramaniam¹, Ephraim J. Gutmark¹, Goutham Mylavarapu¹, Christian Trolle², Steffen Ringgaard², Claus H. Gravholt¹, Philippe F. Backeljauw³, and Iris Gutmark-Little³
¹University of Cincinnati, Cincinnati, OH, ²Cincinnati Children's Hospital Medical Center, Cincinnati, OH, ³Aarhus University Hospital, Aarhus, Denmark

Fri–193
Patient-Specific Computational Modeling of Aortic Blood Flow In Turner Syndrome
Dhananjay Radhakrishnan Subramaniam¹, Ephraim J. Gutmark¹, Christian Trolle², Steffen Ringgaard², Claus H. Gravholt¹, Philippe F. Backeljauw³, and Iris Gutmark-Little³
¹University of Cincinnati, Cincinnati, OH, ²Aarhus University Hospital, Aarhus, Denmark, ³Cincinnati Children's Hospital Medical Center, Cincinnati, OH

Fri–194
Transapical Coaptation Plate for Functional Mitral Regurgitation: An In-vitro Study
kailiang zhang¹ and Zhaoming He¹
¹Texas Tech University, Lubbock, TX

Fri–195
Modeling Multi-scale Blood Rheology in a Straight Microvessel
Zelin Xu¹ and Clement Kleinstreuer¹,²
¹North Carolina State University, Raleigh, NC, ²NC State University/UNC Chapel Hill, Raleigh, NC
Tracks: Cellular and Molecular Bioengineering, Biomechanics

Cellular and Molecular Biomechanics: Mechanobiology

Fri–203
Mechanical Force Across A-Cadherin Coordinates Proliferation in Epithelial Cell
Abhinav Mohan¹
¹Virginia Commonwealth University, Richmond, VA

Fri–204
Multicellular Regulation of Tensile Homeostasis
Alicia Zollinger⁵, Elizabeth Canovic³, Michael Smith¹, and Dimitrije Stamenovic⁵
¹Boston University, Boston, MA, ³Massachusetts Institute of Technology, Cambridge, MA

Fri–205
The Effect of Cell Cortex on OMTC Measurements
Amir Vahabikashi¹, Chan Young Park², Jeffrey Fredberg², and Mark Johnson¹
¹Northwestern University, Evanston, IL, ²Harvard University, Boston, MA

Fri–206
Cytoplasmic Stiffness in Migrating Cells at the Interface of a Chemical/Mechanical Gradient
Andrew Ford¹ and Padma Rajagopalan¹
¹Virginia Tech, Blacksburg, VA

Fri–207
Origin of Axonal Tension through the Study of Single Axon Contraction in vivo
Anthony Fan¹, Alireza Tofangchi¹, and Taher Saiti¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Fri–208
Predicting Elastic and Shear Moduli of Regions of the Lens from Lens Fiber Cell Morphology
Bharat Kumar¹ and Matthew Reilly¹
¹Ohio State University, Columbus, OH

Fri–209
Mechanically Coupled Cell-Matrix Interactions Predicted with a 2.5-D Computational Model
Maziar Aghvami¹ and Edward Sander¹
¹University of Iowa, Iowa City, IA

Fri–210
Interaction of Alcohol Level and Stretch Pattern on Mitochondrial Function in Vascular Smooth Muscle Cells Using Live Imaging
Elizabeth Bartolak-Suki³
³Boston University, Boston, MA

Fri–211
Oscillations in Microglial Cells are Regulated by Actomyosin Contractility
Eunyoung Park¹, Young Bin Cho¹, Unghyun Ko¹, Jin-Sung Park¹, Sufuyang Park¹, and Jennifer H. Shin¹
¹Korea Advanced Institute of Science and Technology, Daejeon, Korea, Republic of

Fri–212
Effect of Membrane Cholesterol on Vascular Smooth Muscle Cell Stiffness and N-Cadherin Adhesion.
Hanna Sanyour¹, Mariah Hoffman¹, Daniel Engbreton¹, and Zhongkui Hong¹
¹University of South Dakota, Sioux Falls, SD

Fri–213
The Effects of Membrane Cholesterol on the Adhesion of Vascular Smooth Muscle Cells to Fibronectin
Josh Childs¹ and ZhongKui Hong¹
¹University of South Dakota, Sioux Falls, SD

Fri–214
Computational Analysis of Actin Filaments-Actin Binding Protein Complex under the External Force
Junki Baek¹, Chanryeol Rhyou¹, and Hyungsuk Lee¹
¹Yonsei university, Seoul, Korea, Republic of

Fri–215
Nonotopography Regulated Fibroblasts Sensing Carbon Nanotubes
Kai Wang¹, Xiaoqing He¹, Will Linthicum², Ryan Mezlan³, Lijing Wang¹, Yong Rojanasakul¹, Qi Wen³, and Yong Yang¹
¹West Virginia University, Morgantown, WV, ²Worcester Polytechnic Institute, Worcester, MA, ³National Institute for Occupational Safety and Health, Morgantown, WV

Fri–216
High-throughput Optomechanical Stiffness Measurement of Single Adherent Cell
Ali Mehrnezhad¹ and Kidong Park¹
¹Louisiana State University, Baton Rouge, LA

Fri–217
Probing the Interactions Between α₁, 4-mannobiosemolecules using Atomic Force Microscopy
Komitige Perera¹, Saswati Basu¹, and Preethi Chandran¹
¹Howard University, Washington, DC

Fri–218
Thermal Acceleration of Bio-Chemo-Mechanical Aspects of Lens Aging
Matthew Reilly¹
¹Ohio State University, Columbus, OH

Fri–219
A High-Throughput Magnetic System to Evaluate Perturbations in Blood Clot Stiffness and Structure Following Inhibition of Platelet Integrin IIb 3
Michael Lawrence¹, Nicole Brackett¹, and William Guilford¹
¹University of Virginia, Charlottesville, VA

Fri–220
Measuring Mechanics of Glial Cells in Simulated Traumatic Brain Injury
Nicholas Braun¹, Zaw Win¹, Kerianne Steucke¹, Dezhi Liao¹, and Patrick Alford¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–221
The Role of Motor-head Distribution and Spacing in Regulating the Function of a Muscle Mimetic System
Carly Farris³, Brianna Manns¹, and Parag Katira¹
¹San Diego State University, San Diego, CA

Fri–222
Development of a Low Cost 3D-Printable Live Cell Stretching Device
Paul Arsenovic¹ and Kranthi Bathula³
¹Virginia Commonwealth University, Richmond, VA, ³Virginia Commonwealth University, Richmond, VA

Fri–223
Coordinated Dynamics of RNA Splicing Speckles in The Nucleus
Qiao Zhang¹, Krishna Kota³, Samer Alam¹, Jeffrey Nickerson⁹, Richard Dickinson¹, and Tannay Lele¹
¹University of Florida, Gainesville, FL, ²Perkin Elmer Inc., Waltham, MA, ³University of Massachusetts Medical School, Worcester, MA

Fri–224
Determination of an Illumination Threshold for Mitigation of Light-Induced Cell Force Relaxation
Samantha Knoll¹ and Taher Saiti¹
¹University of Illinois at Urbana-Champaign, Urbana, IL
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<td>Yizhi Jiang¹ and Julie Ji</td>
<td>¹Indiana University Purdue University Indianapolis, Indianapolis, IN</td>
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<td>Stretch Control of Beta-catenin Nuclear Translocation in MSCs and Its Mediation by N-cadherin</td>
<td>Jeong Soon Lee¹, Liygeom Ha¹, and Jung Yul Lim¹</td>
<td>¹University of Nebraska-Lincoln, Lincoln, NE</td>
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<td>Somatodendritic Distribution and Nanoclustering of SK Channels Is Under The Control Of PKA</td>
<td>Krithika Abiraman¹, Randall Walikonis¹, Anastasios Tzinngounis¹, and George Lykotrafitis¹</td>
<td>¹University of Connecticut, Storrs, CT</td>
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<td>Effect of Temperature and Dosage of Chemotherapeutic Drugs on Cellular Metabolism</td>
<td>Likitha Somasekhar¹</td>
<td>¹Florida Institute of Technology, Melbourne, FL</td>
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<td>An Integrated Microfluidic Platform for High-throughput, Single-cell Physical and Biochemical Phenotyping</td>
<td>Lillian Peng¹, Jonathan Lin¹, and Dino Di Carlo¹</td>
<td>¹University of California Los Angeles, Los Angeles, CA</td>
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<td>Fri–250</td>
<td>Low-Intensity Vibration Mitigates Diabetes-Induced Inflammation in Adipocyte: An In Vitro Study</td>
<td>Maggie Haviland¹, Karen Wong¹, Quynh Nhu Le¹, Vihtaben Patel¹, Clinton Rubin¹, and Mei Lin Chan¹</td>
<td>¹State University of New York at Stony Brook, Stony Brook, NY</td>
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<td>Fri–251</td>
<td>The Role of miR-744 in Endothelial Inflammation and Atherosclerosis</td>
<td>Rachel Simmons¹, Salim Thabet¹, and Hanjoong Jo¹</td>
<td>¹Georgia Institute of Technology, Atlanta, GA</td>
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<td>Fri–252</td>
<td>A Large-Scale, Functional Screening of Mammalian Mechano-sensitive Genes Using Drosophila RNAi Library- Smarcd3/Bap60 Is a Mechano-sensitive Pro-Inflammatory Gene</td>
<td>Sandeep Kumar¹, In Hwan Jang¹, Chanwoo Kim¹, Dong Won Kang¹, Won Jae Lee¹, and Hanjoong Jo¹</td>
<td>¹Emory University, Atlanta, GA, ²National Creative Research Initiative Center for Hologenomics, Seoul National University, Seoul, Korea, ³Republic of, ⁴Georgia Institute of Technology and Emory University, Atlanta, GA</td>
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<td>Fri–253</td>
<td>Progerin and Lamin-A are Equally Phosphorylated in iPSC-derived Mesenchymal Stem Cells: Quantitation by Fine-excision &amp; Alignment Mass Spectrometry (FEA-MS)</td>
<td>Sangkyun Cho¹, Amal Abbas¹, and Dennis Discher¹</td>
<td>¹University of Pennsylvania, Philadelphia, PA</td>
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<td>Fri–254</td>
<td>Molecular Determinants of Cadherin Ideal Bond Formation: Conformation Dependent Unbinding On A Multidimensional Landscape</td>
<td>Kristine Manibog¹, Kannan Sankar¹, Sunae Kim¹, Yunxiang Zhang³, Robert Jernigan¹, and Sanjeevi Sivasankar¹</td>
<td>¹Iowa State University, Ames, IA, ²Stanford University, Stanford, CA</td>
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<td>Fri–255</td>
<td>Microgravity Compromises Actin Cytoskeleton Resulting in Increased Nuclear Height in MSCs</td>
<td>Soll Kim¹, Kaushik Puranam¹, Aditi Senthinathan¹, Janet Rubin¹, and Gunes Uzer¹</td>
<td>¹University of North Carolina at Chapel Hill, Chapel Hill, NC</td>
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<td>Fri–256</td>
<td>Endogenous Sheet Tension within an Epithelial Cell Colony is Anisotropic</td>
<td>Venkat Maruthamuthu¹ and Sandeep Dumbali¹</td>
<td>¹Old Dominion University, Norfolk, VA</td>
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<td>Fri–257</td>
<td>Nuclear Volume Expansion Induced by Cell Shape Changes During Migration</td>
<td>Vincent Tocco¹, Varun Aggarwal¹, Sandra Baker-Groberg², Owen McCarthy², Richard Dickinson³, and Tanmay Lele¹</td>
<td>¹University of Florida, Gainesville, FL, ²Oregon Health &amp; Science University, Portland, OR</td>
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**Track: Biomechanics**

**Neuromuscular Biomechanics**

| Fri–258 | The Effect of Visual Distortion on Human Gait Parameters | Gabrielle Maestas¹, Pranathi Chunduru¹, Seung-jae Kim², and Hyunglae Lee¹ | ¹Arizona State University, Tempe, AZ, ²California Baptist University, Riverside, CA |

**Tracks: Biomechanics, Orthopaedic and Rehabilitation Engineering**

**Orthopedic Mechanobiology and Mechanotransduction**

| Fri–259 | Intermittent Vibrations Reduce Inflammation, Apoptotic Signaling and Oxidative Damage in Prolongedly Compressed Muscle Tissues: A Senescence-Accelerated Mouse Model | Brian C. H. Cheung¹, T. K. Pang¹, S. W. Wong¹, and Arthur F. T. Mak¹ | ¹The Chinese University of Hong Kong, Shatin, Hong Kong |
| Fri–260 | Bone-on-Chip to Study Osteocyte Mechano-Transduction and ECM Production | Elisa Budyn¹,², Morad Bensidhoum³, Samantha Sanders¹, Eric Schmidt¹, Patrick Tauc¹, Eric Deprez¹, and Herve Petite³ | ¹Ecole Normale Superieure de Cachen, Cachen, France, ²University of Illinois at Chicago, Chicago, IL, ³University Paris 7, Paris, France |

**Fri–261**

Mechanical Loading Attenuates Radiation-induced Bone Loss

Henry Donahue¹, Peter Govey¹, and Yue Zhang¹ | ¹Virginia Commonwealth University, Richmond, VA, ²Penn State, Hershey, PA |

**Fri–262**

Mechanical Properties of Incudostapedial Joint at High Strain Rate Measured by SHTB

Shangyuanyang Jiang¹, Huiyang Luo², Hongbing Lu², and Rong Z. Gan¹ | ¹University of Oklahoma, Norman, OK, ²Oregon Health & Science University, Portland, OR |

**Tracks: Orthopaedic and Rehabilitation Engineering, Biomedical Imaging and Optics**

**Imaging Techniques for Musculoskeletal System**

| Fri–263 | Ultrasound Elastography Probe Design for Rotator Cuff Diagnosis | Chris Bocklet¹, Emily Kowel¹, Glenn Heftel¹, Mari Marlow¹, Mia Warner¹, Will Harley¹, Delphine Dean¹, and David Kwartowitz¹ | ¹Clemson University, Clemson, SC |
Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm

Tracks: Biomechanics, Biomedical Imaging and Optics

Imaging Techniques in Biomechanics

Fri–264
3D Analysis Method of Angular Rotation Between Ideal and Actual Femur Positions in Anterior-posterior X-ray Images
Eungjuem Shim¹, Sehyung Park¹, Youngjun Kim¹, and Byung Hoon Lee²
¹Korea Institute of Science and Technology, Seoul, Korea, República do, ²Hallym University Medical Center, Seoul, Korea, República do

Fri–265
Skeletal Muscle Blood Flow Measured by Diffuse Correlation Spectroscopy and Fluorescent Microspheres
Ashley Proctor¹, Gabriel Ramírez², Tracy Bubel¹, Songfeng Han¹, and Regina Chou³
¹University of Rochester, Rochester, NY

Fri–266
Computer-Aided Detection for Plastic Deformation Fractures in Pediatric Forearm
Yuiwei ZHOU¹, Uygar Teomete¹, and Weizhao Zhao¹
¹University of Miami, Coral Gables, FL

Fri–267
Multi-channel Light Sheet Microscopy for Intact Mouse Eyeball
Jianguo Ma¹, Liwei Zhang², Yi Chen², Paninaz Abiri¹, Guangyu Li², Lu Chen², and Tzung Hsiai¹
¹University of California, Los Angeles, Los Angeles, CA, ²University of California at Berkeley, Berkeley, CA

Fri–268
The Effects of Collagen Density and Pore Size on In Vitro Cancer Cell Migration
Van Lam¹, Tyler Zimmerman¹, Byung Min Chung¹, and Christopher Raub¹
¹The Catholic University of America, Washington, DC

Fri–269
Wide-field Mapping of Collagen Fiber Orientation and Orientation Distribution in Soft Tissues
Will Goth¹, Michael Sacks¹, and James Tunnell¹
¹The University of Texas at Austin, Austin, TX

Fri–270
Effect of Nonlinear Inversion Parameters on MR Elasticography of Human Brain
Aaron Anderson¹, Curtis Johnson², Matthew McGarry³, Keith Paulsen⁴, Bradley Sutton¹, Elijah Van Houten⁵, and John Georgiadis⁶
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Delaware, Newark, DE, ³Dartmouth College, Hanover, NH, ⁴Dartmouth-Hitchcock Medical Center, Lebanon, NH, ⁵Université de Sherbrooke, Sherbrooke, QC, Canada, ⁶Illinois Institute of Technology, Chicago, IL

Fri–271
Reconstructing Blood Velocity Profiles from Noisy 4D-PCMR Data using Ensemble Kalman Filtering
Ali Bakshshinejad¹, Vitaliy Rayz²,³, and Roshan M. D’Souza¹
¹University of Wisconsin-Milwaukee, Milwaukee, WI, ²Medical College of Wisconsin, Milwaukee, WI

Fri–272
Exploring the Accuracy of Micro-CT Guided Finite Element Analysis
Ashley Jackson¹
¹North Carolina A&T State University, Greensboro, NC

Fri–273
Diffusion Tensor Imaging and MR Elastography of the Mini-Pig Brain In Vivo
Charlotte Guertler¹, Ruth Okamoto⁴, Alex Cerjanic³, Curtis Johnson³, and Philip Bayl¹
¹Washington University in St. Louis, St. Louis, MO, ²University of Illinois at Urbana-Champaign, Urbana, IL, ³University of Delaware, Newark, DE

Fri–274
Volumetric and Structural Analysis of Intervertebral Disc in Open Upright MRI in Humans During Standing
Christian Weber¹ and Simon Tang¹
¹Washington University in St. Louis, St. Louis, MO

Fri–275
Supraspinatus Tendon Degeneration is Correlated with Quantitative Ultrasound Measures
Gerald Ferrer¹, R Matthew Miller¹, Masahito Yoshida¹, Amir A Rahbemai-Azar¹, Volker Musahl¹, and Richard E Debski¹
¹University of Pittsburgh, Pittsburgh, PA

Fri–276
Mechanical Anisotropy of Ex Vivo Bovine Intervertebral Disc From Magnetic Resonance Elastography
John Schmidt¹, Pierre-François Beauchemin³, Ruth Okamoto¹, Joel Garbow¹, Delphine Périer²,³, and Phil Bayl¹
¹Washington University, St. Louis, MO, ²Rheolution Inc., Montréal, QC, Canada, ³Ecole Polytechnique de Montréal, Montréal, QC, Canada, ⁴Centre hospitalier universitaire Sainte-Justine, Montréal, QC, Canada

Fri–277
Visualizing the Nonlinear Mechanics of Collagen in Eye Tissue
Ning-Juan Jan¹, Michael Iasella¹, Mason Lester¹, Danielle Hu¹, Kira Lathrop¹, Huong Tran¹, Andrew Voorhees¹, Gadi Wollstein¹, Joel Schuman², and Ian A. Sigal¹
¹University of Pittsburgh, Pittsburgh, PA, ²New York University, New York, NY

Fri–278
Constitutive Modeling of Fibrotic Liver Tissues: A Systems Biology Approach
Yu Wang¹ and Jingfeng Jiang¹
¹Michigan Technological University, Houghton, MI

Tracks: Biomedical Imaging and Optics, Tissue Engineering

Imaging Techniques in Tissue Engineering

Fri–279
Differential Z Scanning: A New, Automated Algorithm for Large FOV Acquisition Across a Signal Gradient Using Traditional Confocal and Multiphoton Microscopy Platforms
Kyle Cowdrick¹, Harsh Patolia¹, George chris², and Frank Marin³
¹Wake Forest Institute of Regenerative Medicine, Winston-Salem, NC, ²University of Virginia, Charlottesville, Charlottesville, VA

Fri–280
Detecting Silica-Coated Gold Nanostars Within Surface-Enhanced Resonance Raman Spectroscopy Mapping Via Semi-Supervised Framework Combining Feature Selection and Classification
Panos Pardalos¹, Jiaxing Pi¹, and Michael Fenn²
¹University of Rochester, Rochester, NY, ²University of California, Los Angeles, Los Angeles, CA, ²University of Virginia, Charlottesville, VA

Tracks: Biomedical Imaging and Optics, Tissue Engineering

Imaging Techniques in Tissue Engineering

Fri–281
From Magnetic Resonance Imaging Techniques in Biomechanics
Kathryn L. Seiler¹, Brian Finley¹, and Steven R. Birdsall¹
¹Rutgers University, New Brunswick, NJ

Fri–282
Multi-Phenotype Imaging for Prostate Cancer Detection
Shana O. Redwine¹, James J. Humphrey²,³, Brian A. Mihalik¹, and David L. Hrapchak¹
¹University of Pennsylvania, Philadelphia, PA, ²University of North Carolina, Chapel Hill, NC, ³Duke University, Durham, NC

Fri–283
A Systems Biology Approach to Brain Tumors
Alvaro I. Díaz¹, John Schmidt¹, Amanda Buck¹, and Frank Marini¹
¹Wake Forest Institute of Regenerative Medicine, Winston-Salem, NC, ²Washington University School of Medicine, St. Louis, MO

Fri–284
Cell Membrane Imaging Using Magnetic Nanoparticles as Contrast Agents
Ender Alaboud¹, Sarah F. Vandeputte¹, and David M. Padula¹
¹University of Missouri-Columbia, Columbia, MO

Fri–285
Microscopy and In Situ Biophysical Characterization of Plasma Membrane Dynamics
Andrew W. Zemann¹, Dan H. Nguyen¹, and Mariusz J. Zajadlo¹
¹University of California, San Francisco, San Francisco, CA

Fri–286
Towards Quantitative Live-Cell Imaging of the Living Brain
William K. Goodspeed¹, Anton J. Palçok¹, and Fredric W. Alt¹
¹Washington University in St. Louis, St. Louis, MO

Fri–287
Age-Related Changes in Whole Blood_Profile Analysis
Gus Quezada¹, Michael E. Seeberg¹, and Tom F. Gabbett¹
¹University of Manchester, Manchester, UK
Fri–281
Development of a Novel Molecular Probe to Track Viable Mesenchymal Stem Cells
Kabir Dhada¹ and Laura Suggs¹
¹University of Texas at Austin, Austin, TX

Tracks: Biomedical Imaging and Optics, Translational Biomedical Engineering Imaging Technologies in Clinical Translation

Fri–282
Ultrasound Characterization of Interface Oscillation as a Proxy for Ventriculoperitoneal Shunt Function
April Joy Aralar¹, Matthew Bird¹, Robert Graham¹, Beomseoo Koo¹, Mahesh Shenai³, Parag Chitnis¹, and Siddharthaa Sikdar¹
¹George Mason University, Fairfax, VA, ³Inova Neuroscience and Spine Institute, Fairfax, VA

Fri–283
Line Scan Microscope for a Leukocyte Differential Based On Colorimetric Ratio
Courtney Hunter¹, Joshua A. Hutcheson¹, Amy J. Powless¹, and Timothy J. Muldoon¹
¹University of Arkansas, White Hall, AR

Fri–284
Measurement of Tissue Phantom Optical Properties at Near-Infrared Wavelengths Using Visible Light Spatial Frequency Domain Imaging
Chun Yeung Yim¹, Raeef Istfan², Darren Roblyer², and Mark Pierce⁶
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Boston University, Boston, MA

Fri–285
Segmentation of Breast Tissue for Infrared Image Analysis
Abia Khan¹ and Murray Loew¹
¹George Washington University, Washington, DC

Fri–286
Physiological Assessment of Wound Healing using a Near-infrared Optical Scanner
Anuradha Godavarty¹, Arash Dadkhah¹, Xing Pang¹, Jiali Lei¹, Rebecca Kwasinski¹, Ruogu Fang¹, and Francisco Perez-Clavijo²
¹Florida International University, Miami, FL, ²Podiatry Care Partners, Doral, FL

Fri–287
Objective Measurement of Intraocular Inflammation with Optical Coherence Tomography
Elliot Crane¹, Alexander B. Crane¹, Ronald Rescigno¹, Ben Szirth¹, and David S. Chu³
³Rutgers New Jersey Medical School, Newark, NJ

Fri–288
Application of Hierarchical Temporal Memory in Anomaly Detection
Jianghao Shen¹ and Murray Loew¹
¹George Washington University, Washington, DC

Track: Biomedical Imaging and Optics Nanotheranostics

Fri–289
Targeted Theranostic Gold Nanoparticles for Imaging and Therapy of Triple Negative Breast Cancer
Nagwa El-Baz¹, Danial Malik¹, Rajat Chauhan¹, Kurtis James¹, Mingming Zhu¹, Junling Li¹, Ayman El-Baz¹, Donald Miller¹, Robert Keynton¹, Chin Ng¹, Paula Bates¹, Mohammad Malik¹, and Martin O’Toole¹
¹University of Louisville, Louisville, KY

Track: Biomedical Imaging and Optics Biomedical Imaging and Optics

Fri–290
Raman Microspectroscopy of Single Cell during Rapid Freezing
Guanglin Yu¹, Yan Rou Yapi¹, Katie Pollock¹, and Allison Hubel¹
¹University of Minnesota, Minneapolis, MN

Fri–291
Measurement-based and Model-based Scatter Correction in Multi-source Interior Computed Tomography
Hao Gong¹ and Guohua Cao¹
¹Virginia Polytechnic Institute and State University, Blacksburg, VA

Fri–292
Development of a Mobile Phone-Based Malaria Diagnostic Device
Kokou Dogbevi¹, Cody Lewis¹, Richard Horner¹, and Gerard Cote¹
¹Texas A&M University, College Station, TX

Fri–293
Improved Spatial Resolution in Optical Projection Imaging with Enhanced Early Photon Detection
Lagnojita Sinha¹, Wei Zhou¹, Jovan Brankov², and Kenneth Tichauer²
¹Illinois Institute of Technology, Chicago, IL, ²Illinois Institute of Technology, Chicago, IL

Fri–294
Simulating Intravital Imaging of Murine Lung for Enhanced Detection of Bacterial Infection
Madeleine Durkee¹, Fatemeh Nooshabadi¹, Patrick Griffin¹, Jeffrey Cirillo², and Kristen Maitland¹
¹Texas A&M University, College Station, TX, ²Texas A&M Health Science Center, Bryan, TX

Fri–295
Comparing Feature-Based Salience Detection Algorithms in Mammograms
Kristina Landino¹ and Murray Loew¹
¹George Washington University, Washington, DC

Fri–296
Generalized 2D SVD Reconstruction for Interior Tomography
Rui Liu¹,² and Hengyong Yu²
¹Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, ²University of Massachusetts Lowell, Lowell, MA

Fri–297
A Kinetic Model to Estimate Retinal Vascular Permeability from Fluorescein Videoangiography Data
Shaoxian Hu¹, Kenneth Tichauer¹, Jennifer Kang-Mieler¹, Wenqiang Liu¹, and Emily Dosmar¹
¹Illinois Institute of Technology, Chicago, IL
**Tracks: Drug Delivery, Cancer Technologies**

**Cancer Drug Delivery**

**Fri–300**
Combination Therapy using Multifunctional Gold Nanoparticles for Cancer Treatment
Binita Shrestha¹ and Liang Tang¹
¹University of Texas at San Antonio, San Antonio, TX

**Fri–301**
The Therapeutic Effect of Epigenetic Drug-encapsulating-lipid Nanoeulsion for Triple Negative Breast Cancer Cells
Bumjun Kim¹ and Debra Auguste¹
¹The City College of New York, New York City, NY

**Fri–302**
Development of Paclitaxel-loaded Polymeric Depots as Drug Delivery System for Cancer Chemotherapy
Chitinarat Thedrattanawong¹, Pinunta Nittayacharn¹, and Norased Nasongkla¹
¹Mahidol University, Nakhon Pathom, Thailand

**Fri–303**
Development of Novel Glutathione-Sensitive Nanoparticles For Lung Cancer Treatment
Daria Zhukova¹, Roshni Iyer¹, Cancan Xu¹, Kytai Nguyen²,³, and Yi Hong¹,²
¹University of Texas at Arlington, Arlington, TX, ²University of Texas at Southwestern Medical Center at Dallas, Dallas, TX

**Fri–304**
KE108-Conjugated Unimolecular Micelles Loaded with a Novel HDAC Inhibitor Thailandepsin-A for Targeted Neuroendocrine Cancer Therapy
Guojun Chen¹, Renata Jaskula-Sztul², April Harrison³, Ajitha Dammalalapati¹, Wenjin Xu¹, Yiqiang Cheng¹, Herbert Chen², and Shaqin Gong¹
¹University of Texas at Arlington, Arlington, TX, ²University of Wisconsin-Madison, Madison, WI, ³University of Texas Southwestern Medical Center, Dallas, TX

**Fri–305**
HIFU-mediated Extracellular Matrix Remodeling for Enhancing Drug Delivery
Hyounkoo Han¹,²,³, Jin Hee Na¹,², Sangmin Lee¹,², Kwangmeyung Kim²,³, and Hyunsheel Kim¹,²
¹Department of Chemical and Biomolecular Engineering, Sogang University, Seoul, Korea, Republic of, ²Biomedical Research Center, Korea Institute of Science and Technology, Seoul, Korea, Republic of, ³Interdisciplinary program of Integrated Biotechnology, Seoul, Korea, Republic of

**Fri–306**
Tunable Release of Anti-Cancer Agents from Silk-Coated Drug Reservoirs
Jeannine M. Coburn¹,³, Rachel Cunningham¹, Akari Miki¹, Bill Chiu², and David L. Kaplan¹
¹Tufts University, Medford, MA, ²Worcester Polytechnic Institute, Worcester, MA, ³University of Illinois at Chicago, Chicago, IL

**Fri–307**
Combinatorial miRNA Delivery via Bioreducible Nanoparticles as a Treatment for Human Glioblastoma
Kristen Koziealski¹, Hernando Lopez-Berton¹, Bachchu Lal¹, Hannah Vaughan¹, John Laterra¹, and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD

**Fri–308**
The Cellular Response of Gold Nanorods in SKBR3 and Hep2 Cells
Lijun Wang¹ and Liang Tang¹
¹University of Texas at San Antonio, San Antonio, TX

**Fri–309**
Efficacy of 5-aminolevulinic Acid (5-ALA)-mediated Photodynamic Therapy (PDT) using Cold Atmospheric Plasma (CAP) as a Light Source for Anti-tumor Applications
Mian Wang¹, Benjamin Gellich¹, Amit Roy¹, Michael Keidar², and Thomas Webster¹,³
¹Northwestern University, Boston, MA, ²Northwestern University, Washington, DC, ³Wenzhou Medical University, Wenzhou, China, People’s Republic of

**Fri–310**
Screening of Lipid-PLGA Hybrid Nanoparticles for Pulmonary Drug Delivery in Lung Cancer Therapy
Serkan Yaman¹,², Kubra Cetiner¹,³, Roshni Iyer¹, and Kytai T. Nguyen¹,²
¹University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center at Dallas, Dallas, TX

**Fri–311**
Astrocytic Differentiation of Human Malignant Glioblastoma U87MG Cells Induced by Porous Poly(1,8-octanediol-co-citrate) Wafers Loaded with All-trans Retinoic Acid
Tarielle Sanders¹ and Antonio Webb¹
¹University of Florida, Gainesville, FL

**Fri–312**
Fabrication of Dendrimer Porphyrin-Decorated Gold Nanoshells for Combined Phototherapies of Cancer
Ui Seok Chung¹, Ji Hong Min¹, Byung Ju Yun¹, Byoung Yong Yoo¹, Eunhyung Kim², Wook-Dong Jang¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

**Fri–313**
Drug Delivery Treatment for Canine Osteosarcoma
Vina Nguyen¹, Annie Kovach¹, Jennifer Gambino¹, Lakeshia Williams¹, Jun Liao¹, and Rajkumar Prabhu¹
¹Mississippi State University, Mississippi State, MS

**Fri–314**
Cationic PLGA Nanoparticles for Improved Therapeutics in Non-Small Cell Lung Cancer
Vivek Gupta¹ and Bhuvaneshwar Vaidya¹
¹Keck Graduate Institute, Claremont, CA

**Fri–315**
Using Nanodiamond for Drug Delivery in Liver Cancer Treatment by Adsorbing Epirubicin
Xin Wang¹, Casuarine Low¹, Weixin Hou¹, Lissa Abdullah¹, and Edward Chow¹
¹National University of Singapore, Singapore, Singapore

**Fri–316**
Encapsulation of an Antiproliferative Metal Chelator, Dp44mT, in Polymeric Nanoparticles
You Jung Kang¹, A.B. Madhankumar¹, James R. Connor², and Sheereen Majd³
¹University of Akron, Akron, OH, ²University of Wisconsin-Madison, Madison, WI, ³University of Alabama at Birmingham, Birmingham, AL
Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC

**Poster Session – Friday**

**Poster Viewing with Authors & Refreshment Break** | 9:30 am–10:15 am and 3:15 pm–4:00 pm

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**Fri–317**
Tumor-targeted Nanoparticles Deliver a Vitamin D-based Drug Payload for Treatment of EGFR Tyrosine Kinase Inhibitor-Resistant Lung Cancer
Chang Liu¹, Suzanne Shoemaker², Tatiana Shaurova³, Qixin Wang³, Martin Petkovich³, Pamela Hershberger², and Yun Wu¹
¹State University of New York at Buffalo, Buffalo, NY, ²Roswell Park Cancer Institute, Buffalo, NY, ³Queen’s University, Kingston, ON, Canada

**Fri–318**
Drug Delivery to a 3D Cancer Spheroid Microarray
Ben Brooks¹,², Fatenah Karandish¹, David Schuette¹, Nikki Davidoff², Sanku Mallik³, and Amanda Brooks²
¹North Dakota State University, Fargo, ND, ²Wasatch Microfluidics, Salt Lake City, UT

**Fri–319**
Stimuli-responsive Polymeric Micelles for Targeting both Cancer Cells and Cancer Stem Cells
Kayla Duval¹, Xing Guo¹, Lin Wang¹, Jing Fan², Shaobing Zhou³, and Zi Chen¹
¹Dartmouth College, Hanover, NH, ²City College of New York, New York, NY, ³Southwest Jiaotong University, Chengdu, China, People’s Republic of

**Fri–320**
Synergistic Photothermal Ablation and Immunostimulation Treatment of Melanoma Metastasis
Patrick McKernan¹ and Roger Harrison¹
¹University of Oklahoma, Norman, OK

**Track: Cancer Technologies**

**Cancer Immunoeengineering**

**Fri–321**
Mucin-based Nanovaccines Activate Dendritic Cells and Promote Cell-mediated Immunity against Cancer
Kasturi Banerjee¹, Prakash Kshirsagar¹, Sushil Kumar¹, Mohd Waism Nasser¹, Shailendra Gautam¹, Kathleen Ross³, Michael Wannemuehler², Surinder Batra¹, Balaji Narasimhan², and Maneesh Jain¹
¹University of Nebraska Medical Center, Omaha, NE, ²Iowa State University, Ames, IA

**Fri–322**
Kelsie Timbie¹, Lena Baddr¹, Benjamin Campbell¹, John McMichael¹, Andrew Buckner¹, Jessica Prince¹, Aaron Stevens¹, Timothy Bullock¹, and Richard Price¹
¹University of Virginia, Charlottesville, VA

**Fri–323**
Tumor Microenvironment Impairs T-cell Antigen Recognition in Mouse Melanoma
Zhou Yuan¹, Nathan Rohner¹, Prithiviraj Jothikumar¹, Susan Thomas³, and Cheng Zhu¹
¹Georgia Institute of Technology, Atlanta, GA

**Tracks: Cancer Technologies, Biomechanics**

**Cancer Mechanobiology**

**Fri–324**
Heterogeneity in Cell-Matrix Adhesion as an Indicator of Tumor Cell Metastatic State
Alexander Fuhrmann¹, Afsheen Banisadr¹, Thea Tlsty², and Adam Engler¹
¹University of California San Diego, La Jolla, CA, ²University of California San Francisco, San Francisco, CA

**Fri–325**
Pancreatic Cancer Microtissues to Investigate the Mechanical Microenvironment of Tumors
Andres Rubiano¹, Dan Delitto¹, Song Han¹, Steven Hughes¹, and Chelsey Simmons¹
¹University of Florida, Gainesville, FL

**Track: Cancer Technologies**

**Emerging Technologies for Cancer Treatment**

**Fri–326**
Making Strong and Stable Plasma-stimulated Medium (PSM) by Multi-approaches
Dayun Yan¹, Annie Talbot¹, Niki Nourmohammadi¹, Jonathan Sherman¹, and Michael Keidar¹
¹The George Washington University, Washington, DC

**Fri–327**
Diffuse Correlation Spectroscopy Detects Chemo Induced Blood Flow Change in Breast Cancer Xenografts
Gabriel Ramirez¹, Ashley Proctor¹, Tong Tong Wu¹, Songfeng Han¹, Kelley Madden¹, Edward Brown¹, Thomas Foster¹, Turgut Durduran², and Regine Choe¹
¹University of Rochester, Rochester, NY, ²Institute of Photonic Sciences, Barcelona, Spain

**Fri–328**
Adhesion Potential of Cancer Cells Ablated with Ethanol and HIFU
Gray Halliburton¹, Hakm Murad¹, and Damir Khismatullin¹
¹Tulane University, New Orleans, LA

**Fri–329**
Enhancing Preferential Glioma Ablation Using Pulsed Electric Fields and Molecular Targeting
Jill Ivey¹, Eduardo Latouche¹, Glenn Lesser², Waldemar Debinski², Rafael Davalos¹, and Scott Verbridge¹
¹Virginia Tech-Wake Forest University, Blacksburg, VA, ²Wake Forest Baptist Medical Center, Winston-Salem, NC

**Fri–330**
Investigation of Non-thermal Atmospheric Pressure Plasma Treatment Effects on Lung Cancer Cells in 3D Collagen Model
Surya karki¹ and Halim Ayan¹
¹University of Toledo, Toledo, OH

**Tracks: Cancer Technologies, Biomedical Imaging and Optics**

**Imaging Strategies and Molecular Profiling in Cancer**

**Fri–331**
OCT and Cold Plasmas: Imaging and Treatment Of Excised Oral Cavity Tumors
Sarah Pickus¹, Jason Zara¹, Nader Sadeghi², Dayun Yan¹, and Michael Keidar¹
¹George Washington University, Washington, DC, ²The GW Medical Faculty Associates, Washington, DC

**Fri–332**
Direct, Multiplexed Molecular Profiling Using Fluorescence Lifetime Imaging
Maha Rahim¹, Rajesh Kota¹, Enrico Gratton¹, and Jered Haun¹
¹University of California Irvine, Irvine, CA
Track: Cancer Technologies
Precision Medicine and Biomarkers in Cancer

Fri–333
Hybrid Soluble/Cellular Target Selection Schemes Improve Discovery of Translatable Ligands
Lawrence Stern¹, Daniel Woldring¹, and Benjamin Hackett¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–334
Applications of The Cancer Genome Atlas for the Identification of RNA-Based Prognostic Biomarkers and Signatures
Nathan Wong¹, Weijun Liu¹, and Xiaowei Wang¹
¹Washington University in St. Louis, Saint Louis, MO

Fri–335
Detecting MicroRNA in Dried Blood for Real-time Monitoring of Treatment Response in Prostate Cancer
Yang Liu¹, Lucas Smith¹, Manish Kohli², and Andrew Smith¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Mayo Clinic, Rochester, MN

Fri–336
The Effect of Very Low Dose X-Ray Radiation on the Proliferation of MCF7 Breast Cancer Cells
Bryana Baginski¹, Joseph Wilson¹, Matthew Rusin¹, Endre Takacs¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

Fri–337
The Effects of Low Dose Radiation on Articular Cartilage
Hannah Cash¹, Jeffrey Wiley², and Delphine Dean¹
¹Clemson University, Clemson, SC, ²Wake Forest University, Winston-Salem, NC

Fri–338
Identifying Shape Changes of Invasive Cancer Cells
Elaheh Alizadeh¹, Samathne Lyons¹, Katherine Schaumberg¹, Joshua Mannheimer¹, Jordan Castle¹, Zachary Bodmer¹, and Ashok Prasad¹
¹Colorado State University, Fort Collins, CO

Fri–339
Multi-analytical Processing of Bronchoalveolar Lavage Samples Using an Automated Exclusion-Based Sample Preparation Platform
Jacob Tokar¹
¹University of Wisconsin-Madison, Madison, WI

Fri–340
Individual Contributions Combined with Public Data in Community Assessments
Jon Moon¹, Imad Jafir¹, Phyllis Brown¹, Kelly Kalvelage², Michael Dorneich³, Christopher Seeger³, Gregory Welk³, and Stephen Gilbert³
³MEI Research, Edina, MN, ²Iowa State University, Ames, IA

Fri–341
Invasion of GL261 Cancer Cells In Vivo is Regulated by Interstitial Flow and Depends on CXCR4 Signaling
Robert Cornelison¹ and Jennifer Munson¹
¹University of Virginia, Charlottesville, VA

Fri–342
Cancer Trap for Capturing Metastatic Prostate Cancer
Yihui Huang¹, Amirhossein Hakamivala¹, Ashwin Nair¹, Jer-Tsong Hsieh¹, and Leping Tang¹
¹the University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center, Dallas, TX

Track: Cardiovascular Engineering
Cardiac Electrophysiology

Fri–343
Co-Occurrence of Depolarization and Repolarization Alternans In ECGs
David Wasemiller¹, Sicqi Wang¹, Paul Anaya¹, and Abhijit Patwardhan¹
¹University of Kentucky, Lexington, KY

Fri–344
Assessing the Effects of Stretch-Activated Channel Blockers in Isolated Swine Hearts
Hanyu Zhang¹, Gregory Walcott¹, and Jack Rogers¹
¹University of Alabama at Birmingham, Birmingham, AL

Fri–345
Optogenetic-Mediated Parasympathetic Reduction of Heart Rate in a Transgenic Mouse Model Using Micro LED Illumination.
Jaclyn Brennan¹, Kendall Endicott², Angel Moreno¹, Gregory Trachiotis³, Igor Efimov², and Matthew Kay¹
¹The George Washington University, Washington, DC, ²George Washington University Medical Center, Washington, DC

Fri–346
Phrenic Nerve Response to Irreversible Electroporation Therapies
Lars Mattson¹, Sydney Newton¹, Nana Mitsuishi¹, and Paul laizzo¹
¹University of Minnesota, Minneapolis, MN

Fri–347
Extracellular Calcium Modulates the Conduction Velocity-Extracellular Potassium Relationship
Michael Entz II¹,² and Steven Poelzing¹,²
¹Virginia Polytechnic Institute and State University, Roanoke, VA, ²Virginia Tech Carilion Research Institute and Center for Heart and Regenerative Medicine, Roanoke, VA

Tracks: Cardiovascular Engineering, Device Technologies and Biomedical Robotics
Cardiovascular Instrumentation and Devices

Fri–348
The Forces Required to Acutely Perforate Human and Swine Left Ventricular Epicardium
Alexander Mattson¹, Justinus Hartoyo¹, Vladimir Grubac², Michael Egggen², and Paul laizzo³
¹University of Minnesota, Minneapolis, MN, ²Medtronic PLC, Mounds View, MN

Fri–349
Design and Analysis of a Cavopulmonary Assist Device for Right Ventricular Dysfunction
Ssu-Ying Chien¹, Jakin Jagani¹, Alexandrina Untaroiu¹, and Mihai Bleiziffer²
¹Virginia Tech, Blacksburg, VA, ²Friedrich-Alexander University of Erlangen-Nuremberg, Erlangen, Germany

Fri–350
Biodegradable Material Characterization for Use in Self-Expanding Stents
Jared Park¹, Debora Porter¹, Jason Porter¹, and Anton Bowden¹
¹Brigham Young University, Provo, UT

Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC
Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm
Fri–351
Mis-sizing of Stent Promotes Intimal Hyperplasia: Impact of Endothelial Shear and Intramural Stress
Henry Chen¹, Brian Bigelow², Deepak Bhatt¹, and Ghassan Kassab¹
¹California Medical Innovations Institute, San Diego, CA, ²St. Vincent Hospital, Indianapolis, IN, ³Brigham and Women’s Hospital, and Harvard Medical School, Boston, MA

Fri–352
Biomechanical Comparison between Mono-, Bi-, and Tri-cusp Valves Architectures
Henry Chen¹, Sean Chambers³, Fedor Lurie³, and Ghassan Kassab¹
¹California Medical Innovations Institute, San Diego, CA, ²COK Medical, Bloomington, IN, ³Jobst Vascular Institute, Toledo, OH

Fri–353
Examination of Erythrocyte Microparticle Formation in a Microfluidic High Shear Environment
James Buercik¹, Trevor Snyder², Dimitrios Papavassiliou¹, David Schmidtke³, and Edgar O’Rea⁴
¹University of Oklahoma, NORMAN, OK, ²Vadovations, Oklahoma City, OK, ³The University of Texas at Dallas, Richardson, TX

Fri–354
Mechanically Enhanced Drug Stamping with Micro-patterned Drug Eluting Balloon for Vascular Drug Delivery
Kang-Ju Lee¹, Seul Gee Lee³, Seung Hyun Park¹, Il Ho Seo¹, Duk Hwan Ahn¹, Min Kwon Lee¹, InKwon Jung¹, Jung Sun Kim², and WonHyung Ryu¹
¹Yonsei University, Seoul, Korea, Republic of, ²Yonsei University College of Medicine, Seoul, Korea, Republic of, ³Genoss Inc., Suwon, Korea, Republic of

Fri–355
Scanning Electron Microscopy Demonstration of Fragmentation of Hydrophilic Coating on Angiographic Guide Wires
Edward Dauer¹, Brad Bradshaw¹, Andrew Brook², Ali Spiro³, Edward Dauer¹, and Melvin Reiner⁴
¹University of Miami (Florida), Coral Gables, FL, ²University of Chicago, Chicago, IL, ³Montefiore Medical Center, New York, NY

Fri–356
Stent Strut Geometry and Hemodynamics Affect Endothelial Cell Migration and Mitosis
Duy Nguyen¹, Blayne Sarazini¹, Alexander Smith¹, Ali Abdelhamid¹, and Juan Jimenez⁴
¹University of Massachusetts, Amherst, MA

Fri–357
Comparison of Systolic And Diastolic Time Intervals from Digital Stethoscope with Tissue Doppler Imaging
Shuang Leng¹, Chow Hung So¹, Feiqiong Huang¹, Jianmin Zhang¹, Chao Wang⁴, Kevin Chaik¹, Liang Zhong¹, and Ru San Tan¹
²National Heart Centre Singapore, Singapore, Singapore, and ³Nanyang Technological University, Singapore, Singapore, ¼Institute of Microelectronics, A³STAR, Singapore, Singapore

Fri–358
In Vitro Assessment of a Keratose-Paclitaxel Drug Coated Balloon
Emily Turner¹, Marzieh Atigh¹, Luke Burnett², and Saami Yazdani¹
¹University of South Alabama, Mobile, AL, ²Keranetics, Winston-Salem, NC

Tracks: Cardiovascular Engineering, Tissue Engineering
Cardiovascular Tissue Engineering

Fri–359
3D In-Vivo-like Neonatal-cardiomyocyte Culture on Wrinkled PDMS
Zhonghai Wang¹, Alin Wei¹, Xiaoqi Yang¹, Siyu Ma¹, Thomas Borg¹, and Bruce Gao¹
¹Clemson University, Clemson, SC

Fri–360
Nanoscaffolds Using Photoluminiscent-Poly-lactones to Prevent Restenosis After PCI
Aneeta Kuriakose¹, Priyesh Rajanikanth², Upasana Mali³, Zack Xie¹, Liping Tang¹, Subhash Banarjee⁴, Jian Yang⁵, and Kytai Nguyen⁵
¹University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center at Dallas, Dallas, TX, ³Pennsylvania State University, University Park, PA, ⁴VA North Texas Health Care System, Dallas, TX

Fri–361
A hiPSC-Derived 3-D Myocardium-On-A-Chip for the Study of Cardiovascular Disease
Bradley Ellis¹, Aylin Acun¹, and Pinar Zorlutuna¹
¹University of Notre Dame, South Bend, IN

Fri–362
Cardiomyogenesis Stimulation by Stretch for P19 Embryonic Carcinoma Cells
Akanshya Shradhanjali¹, Jeong Soon Lee¹, Ligyeyom Ha¹, and Jung Yul Lim¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–363
Oligonucleotides Target the SERCA/PLN Complex in Cardiomyocytes
Kailey Soller¹, Jing Yang¹, Raffello Verardi¹, Gianluigi Veglia¹, and Michael Bowser¹
¹University of Minnesota, Minneapolis, MN

Fri–364
Using 3D Printing to Customize Engineered Blood Vessel Size
Mai Lam¹, Cameron Pinnock¹, Elizabeth Meier¹, and Bin Wu¹
¹Wayne State University, Detroit, MI

Fri–365
Fibroblast Architecture in Patients with Heart Disease Due to LMNA Mutation
Mehrsa Mehrabi¹
¹University of California, Irvine, Irvine, CA

Fri–366
Engineering Cardiac Tissues on Matrices with Independent Biochemical and Mechanical Properties
Nethika R. Anysinghe¹, Caitlin H. Reck¹, Andrew P. Petersen¹, Davi M. Lyra-Leite¹, Nathan Cho¹, and Megan L. McCain¹
¹University of Southern California, Los Angeles, CA

Fri–367
Polymer Microfiber Meshes Facilitate Human Cardiac Stem Cell Proliferation and Differentiation
Lijuan Kan¹, Patrick Thayer¹, Ben Ledford¹, Miao Chen¹, and Aneetta Kuriakose¹
¹University of Texas at Arlington, Arlington, TX, ²University of Texas Southwestern Medical Center at Dallas, Dallas, TX, ³Pennsylvania State University, University Park, PA, ⁴VA North Texas Health Care System, Dallas, TX

Fri–368
Cytoskeletal Reorganization of Marrow Stem Cells in Response to Flow
Sana Nasim¹, Denise Medina¹, Glenda Castellanos¹, Sasmita Rath¹, and Sharan Ramaswamy¹
¹Florida International University, San Diego, CA

Fri–369
Liver-Mediated Prevention of Ischemic Cardiomyocyte Calcification
Shu Liu¹, Sahil Shah¹, and Yu Wu¹
¹Northwestern University, Evanston, IL

Fri–370
A Novel Biphasic Vascular Graft for Engineering Small Diameter Blood Vessels
Vidhya Ramaswamy¹, Allison Goins¹, and Josephine Allen¹
¹University of Florida, Gainesville, FL

Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am and 3:15 pm–4:00 pm

Poster Session—Friday

Friday, October 7 | 9:30 am–5:00 pm | Poster Session | Exhibit Hall BC
Fri–371
Organotypic Culture System for Cardiac Tissue
Yun Qiao1,2, Quan Dong1, Chaoyi Kang3, Baichen Li1, Zhenyu Li1, and Igor Efimov1
1George Washington University, Washington, DC
2Washington University in St. Louis, St. Louis, MO

Fri–372
Tissue Engineered Tunica Adventitia Graft
Bijal Patel1, Cameron Pinnock2, and Mai Lam2
1Wayne State University, Canton, MI, 2Wayne State University, Detroit, MI

Fri–373
Engineering a Living Mitral Valve Using a Stabilized Collagen and Elastin-Based Scaffold
Christopher deBorde1, Dan Simionescu1, Leslie Sierad2, Jun Liao3, Christopher Wright4, and Agneta Simionescu1
1Clemson University, Clemson, SC, 2Purdue Bioreactors, Clemson, SC, 3Mississippi State University, Mississippi State, MS, 4Greenville Hospital System, Greenville, SC

Fri–374
Electrospun Polyurethane and Hydrogel Composite Scaffolds to Study Valve Cell Fibrotic Response
Daniel Puperi1, Alysha Kishan1, Zoe Punske1, Elizabeth Cosgriff-Hernandez2, Jennifer West3, and Jane Grande-Alden4
1Rice University, Houston, TX, 2Texas A&M, Houston, TX, 3Duke University, Durham, NC

Fri–375
Surface-modified Poly(vinyl alcohol) Vascular Grafts Improve Endothelialization without Increasing Thrombosis
Deirdre Anderson1, Marie Cutiongco2, Pascale Chevallier3, Diego Mantovani1, Evelyn Yim2, and Monica Hinds1
1Oregon Health & Science University, Portland, OR, 2National University of Singapore, Singapore, Singapore, 3Laval University, Quebec, Canada, 4University of Waterloo, Waterloo, ON, Canada

Fri–376
Fabrication of an Elastomeric Scaffold with Cell-Derived ECM for Cardiovascular Tissue Engineering
Harleigh Warner1,², William D. Wagner1,²,³
1Wake Forest–Virginia Tech, Winston Salem, NC, 2Wake Forest University School of Medicine, Winston Salem, NC, 3Wake Forest School of Medicine, Winston Salem, NC

Fri–377
Engineering Human Stem Cell-Derived Cardiac Tissues for Heart-on-a-Chip
Joycelyn Yip1, Nathen Cho1, and Megan McCain1
1University of Southern California, Los Angeles, CA

Fri–378
Stable Engineered Vascular Networks from Human iPSC-Derived Endothelial Cells in Synthetic Hydrogels
Matthew Zanottelli1, Hamisha Ardalan2, Eric Nguyen2, Angela Xie2, Michael Schwartz2, and William Murphy2
1Cornell University, Ithaca, NY, 2University of Wisconsin-Madison, Madison, WI

Fri–379
Nanoengineered Hydrogel Topographies for the Development of Organized Cardiac Tissues
Ali Navaei1, Nathan Moore1, Ryan Sullivan3, Raymond Migrino2, and Mehdi Nikkhah2
1Arizona State University, Tempe, AR, 2Arizona State University, Tempe, AZ, 3Phoenix Veterans Affairs Health Care System, Phoenix, AZ

Fri–380
Vascular Differentiation of Adipose Derived Stem Cells on Porcine Decellularized Cardiac Slices In Vitro
Mickey Shah1, Pawan KC1, Keyvan Amini Khoiy1, Rouzbeh Amini1, and Ge Zhang1
1University of Akron, Akron, OH

Fri–381
Stiffness Impacts Tissue Formation and Syncytium Development in Engineered Human Myocardium
Nicholas Kaiser1 and Kareen Coulombe1
1Brown University, Providence, RI

Fri–382
Recellularization Strategies to Promote Pre-Vascularization of Decellularized Cardiac Tissue
Pawan KC1, Mickey Shah2, and Ge Zhang2
1The University of Akron, Ridgewood, NY, 2The University of Akron, Akron, OH

Fri–383
Dynamically stiffening Hydrogels for Cardiac Tissue Engineering
Rachel Bessert1, Diana Velluto2, and Ashutosh Agarwal2
1University of Miami, Boca Raton, FL, 2University of Miami, Miami, FL

Fri–384
Autologous Decellularized Graft for Vascular Tissue Engineering
Xuefeng Qu1,2, Benjamin Lee1, and Song Li3
1University of California, Los Angeles, Los Angeles, CA, 2University of California, Berkeley, Berkeley, CA, 3Union Hospital, Tongji Medical School, Huazhong University of Science and Technology, Wuhan, China, People’s Republic of

Fri–385
"Off-the-Shelf" Tissue-Engineered Aortic Valve with Surgical and Transcatheter Design
Zeeshan Syedain1, Brandon Tefft2, Melissa Young3, Amir Lerman2, and Robert Tranquillo1
1University of Minnesota, Minneapolis, MN, 2Mayo Clinic, Rochester, MN

Fri–386
Slice-by-Slice Evaluation of Wall Shear Stress in Stented Coronary Arteries Reconstructed Using Optical Coherence and Computed Tomography: Uncovering the Stimuli for Restenosis and Resorption
Ali Aleiou1, Amirhossein Arzani2, Shawn Shadden2, Mehdi Maadooliat3, Hiromasa Otake3, and John LaDisa4,5
1University of California, Berkeley, Berkeley, CA, 2Kobe University Graduate School of Medicine, Kobe, Japan, 3Medical College of Wisconsin, Milwaukee, WI, 4Marquette University, Milwaukee, WI, 5University of California, Milwaukee, WI

Fri–387
Pulsatile Flow Studies of a Bovine Pericardial Heart Valve Bioprosthesis in Low, Normal, and High Cardiac Outputs: PIV Measurements
Mohammad Barakat1, Koohyar Vahidkhah1, Mostafa Abbasi1, and Ali Azadani1
1University of Denver, Denver, CO

Fri–388
Elucidating the Mechanisms of Irreversible Vascular Changes after Treatment for Aortic Coarctation
Brandon Wegter1, Thomas Eddinger1, Aoy Tomita-Mitchell3, Karl Stamm2, Donna Mahnek2, Mary Goetsch2, Michael Mitchell1, Ronald Woods3, and John LaDisa2
1Marquette University, Milwaukee, WI, 2University of California, Berkeley, Berkeley, CA, 3Kobe University Graduate School of Medicine, Kobe, Japan, 4Medical College of Wisconsin, Milwaukee, WI

Fri–389
Small-Scale Ex Vivo Perfusion Mock Circulation Model to Simulate Mechanical Circulatory Support
Kevin Soucy1, Mitchell Buller1, Guruprasad Giridharan1, Michael Sobieski1, and Mark Slaughter1
1University of Louisville, Louisville, KY
Fri–390  
Ultrasound Indicator Dilution Quantifies Renal Blood Flow Distribution in Rat Models of Hypertension  
John Bukowy1, Louise Evans1, Allen Cowley1, and Daniel Beard2  
1Medical College of Wisconsin, Milwaukee, WI, 2University of Michigan, Ann Arbor, MI

Fri–391  
Effect of Pulmonary Vasodilators on Lung Diffusing Capacity during Exercise in Young Healthy Individuals: Preliminary Results  
Kirsten Coffman1, Timothy Curry1, Niki Dietz1, and Bruce Johnson1  
1Mayo Clinic, Rochester, MN

Fri–392  
Volumetric PIV Investigation of Hemodynamics and Pressure in a Cerebral Aneurysm  
Melissa Brindise1, Benjamin Dickerhoff2, David Saloner2, Vitaliy Rayz3, and Pavlos Vlachos1  
1Purdue University, West Lafayette, IN, 2Marquette University, Milwaukee, WI, 3University of California, San Francisco, San Francisco, CA, 4University of Wisconsin-Milwaukee, Milwaukee, WI

Fri–393  
Porcine Small Intestinal Submucosal Mitral Valve Hydrodynamics: Preliminary Assessment  
Onkar Mankame1, Ricardo Hausz2, Lilliam Valdes-Cruz3, Steven Bibevski4, Frank Scholl5, Sarah Bell6, Ivan Basz7, and Sharan Ramaswamy8  
1Florida International University, Miami, FL, 2University of Nebraska, Lincoln, NE, 3Children’s Hospital & Medical Center, Omaha, NE, 4University of Minnesota, Minneapolis, MN

Fri–394  
Effects of Geometric Variations on Idealized Bifurcation Aneurysm Hemodynamics Treated with Pipeline Embolization Device  
Priya Nair1, Brian Chong2, Matthew Mortensen3, and David Frakes1  
1Arizona State University, Tempe, AZ, 2Mayo Clinic Hospital, Phoenix, AZ, 3EndoVantage, LLC, Scottsdale, AZ

Fri–395  
Effect of Core Temperature on the Venous System  
A. Colleen Crouch1, Olivia Palmer1, and Joan Greve1  
1University of Michigan, Ann Arbor, MI

Fri–396  
A Perfusion Apparatus to Image Semilunar Valve Anatomies in Perfusion-Fixed Human Hearts  
Evan Johnson1, Lars Mattsson1, Alex Mattson1, and Paul A. Iaizzo1  
1University of Minnesota, Minneapolis, MN

Fri–397  
Modified Cerebrovascular Reactivity Parameter Results in Less Variability in Measurements  
Madison Burger1, Mohammed Alwatban1, Benjamin Hage1, Edward Truemper1,2, and Greg Bashford1,2  
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE

Fri–398  
Analysis of Breath-Holding Index as an Assessment of Cerebrovascular Reactivity  
Allison Porter1, Mohammed Alwatban1, Edward Truemper2,3, and Greg Bashford1,2  
1University of Nebraska, Lincoln, NE, 2Children’s Hospital & Medical Center, Omaha, NE
**Track: Cardiovascular Engineering**

**Lymphatic System**

**Fri–409**
Analysis of Mechanical Contractility of Lymphatic Vessels Under Varying Flow Conditions
Anish Mukherjee¹, Joshua Hooks¹, Zhanna Nepiyushchikh¹, and James Dixon¹
¹Georgia Institute of Technology, Atlanta, GA

**Fri–410**
Mapping Lymphatic Vessels in the Rat Mesentery to Improve Multiscale Lymphatic Flow Models
Caleb Davis¹, Irina Nizamutdinova², Michael Moreno¹, and David Zawieja²
¹Texas A&M University, College Station, TX, ²Texas A&M Health Science Center, Temple, TX

**Fri–411**
Characterization of Lymphatic Flow in vivo in Wild-type Mice
Akshay Pujari¹, Daniel Sweet², Mark Kahn³, and Juan Jimenez²
¹University of Massachusetts, Amherst, MA, ²University of Pennsylvania, Philadelphia, PA

**Track: Cardiovascular Engineering**

**Microcirculation**

**Fri–412**
Nitrite-mediated Vasodilation Quantified from In Vivo Studies in Rat Mesentery
Donald Buerk¹, Kelly A. Zaccheo¹, Kenneth A. Barbee¹, and Dov Jaron¹
¹Drexel University, Philadelphia, PA

**Fri–413**
Development of an Ex Vivo Intact Microvascular Network Model: Evaluation Of Smooth Muscle Cell Constriction
Jessica Motherwell¹, Mohammad Azimi¹, Prasad Katakam¹, and Walter Murfee¹
¹Tulane University, New Orleans, LA

**Fri–414**
A Cell Culture Device with Continuous Oxygen Gradient for Microcirculation Research in vitro
Kanae Kadokura¹, Asako Sato¹, Brice Boudehent¹, and Kosuke Tsukada¹
¹Keio University, Yokohama, Japan

**Fri–415**
Systems Framework for Multi-dimensional Redox System Regulations in Vascular Dysfunction
Sheetal Joshi¹, Hemang Patel², and Mahendra Kavdia¹
¹Wayne State University, Detroit, MI

**Fri–416**
Shear Stress and Cyclic Stretch Regulate Blood Brain Barrier Integrity
Paul Partyka¹ and Peter Galie¹
¹Rowan University, Glassboro, NJ

**Fri–417**
Influence of Red Blood Cell Aggregation on Perfusion of an Artificial Microvascular Network
Nathaniel Piety¹, Walter Reinhart², and Sergey Shevkoplyas³
¹University of Houston, Houston, TX, ²Kantonsspital Graubünden, Chur, Switzerland

**Track: Cardiovascular Engineering**

**Thrombosis and Hemostasis**

**Fri–418**
Platelet Gplb Binding to VWF-A1 is More Prominently Regulated by the Proximal D’D3- Rather than A2-Domain
Changjie Zhang¹, Kelkar Anju¹, Nasirikenari Mehrab², Joseph T Lau³, and Sriram Neelamegham¹
¹SUNY at Buffalo, Buffalo, NY, ²Molecular and Cellular Biology, Roswell Park Cancer Institute, Buffalo, NY

**Fri–419**
The Development of an Assay to Assess the Priming of Platelets by Multiple Surface Bound Agonists
Colin Eichinger¹ and Vladimir Hlady¹
¹University of Utah, Salt Lake City, UT

**Fri–420**
Targeted Xa Inhibition for the Treatment of Venous Thrombosis
Donny Hanjaya-Putra¹,²
¹Harvard Medical School, Boston, MA, ²Wyss Institute for Biologically Inspired Engineering, Boston, MA

**Fri–421**
The Influence of Hematocrit on Thrombus Propagation in an In Vitro Model of Venous Thrombosis
Marcus Lehmann¹ and Keith Neeves¹
¹Colorado School of Mines, Golden, CO

**Fri–422**
Do Quadrupeds Develop Edema Post Venous Thrombosis?
Olivia Palmer¹, Jose Antonio Diaz¹, and Joan Greve¹
¹University of Michigan, Ann Arbor, MI

**Track: Cardiovascular Engineering**

**Advanced Single Cell Probes**

**Fri–423**
Fetuin-A Supplementation as an Effective Therapy in Regulating Phenotypic Differentiation of Smooth Muscle Cells in Vascular Calcification
Justin B. McMahan¹, Amber M. Kay¹, James A. Stewart Jr¹, and C. LaShan Simpson¹
¹Mississippi State University, Starkville, MS

**Fri–424**
Dispersion in Flowing Blood: A Theoretical Structure for Experimental First Passage Studies
Eugene Eckstein¹, Vinay Bhall¹, Mark Leggas¹, JoDe Lavine¹, Baoshun Ma¹, and Jerome Goldstein¹
¹University of Memphis, Memphis, TN

**Track: Cellular and Molecular Bioengineering**

**Fri–425**
Rapid Uptake and Ubiquitination of Fluorescent Peptides into Mammalian Cells Using a &ß-Hairpin Sequence Motif
Nora Safabakhsh¹, Jeffrey Anderson¹, Manibrarthavathu Saiyidiyanath¹, Jacob pettiqrew¹, Gavin Pappas¹, Ted Gauthier¹, and Adam Melvin¹
¹Louisiana State University, Baton Rouge, LA

**Fri–426**
Single Cell Patterning in Stiffness-Tunable Hydrogels for High Throughput Studies
Xiangyu Gong¹ and Kristen Mills¹
¹Rensselaer Polytechnic Institute, Troy, NY
Tracks: Cellular and Molecular Bioengineering, Nano and Micro Technologies

Micro/Nano Tools in Molecular Biology (Genomics, Proteomics)

Fri–427
Towards a Cell-Level Personalization of Nanomedicine: Pathology Dependent In Situ Reduction of Gold Nanoparticles by Action of Mammalian Cells.
Aaron Schwartz-Duval¹, Enrique Daza¹, Santosh Misra¹, Elsey Johnson², Prabuddha Mukherjee³, Rohit Bhargava¹, and Dipanjit Pan¹
¹University of Illinois Urbana Champaign, Urbana, IL, ²Cytoviva Inc., Auburn, AL

Fri–428
Visualization of Protein Myristoylation During Cellular Differentiation
Andrew Witten¹, Meghan A. Troare¹, Sarah Calve¹, and Tamara Kinzer-Ursem¹
¹Purdue University, West Lafayette, IN

Fri–429
Proteomic Analysis of Exosomes Derived from Neuronal Cells to Determine Factors Promoting Neuronal Differentiation
Do Young Koo¹, Xuewei Zhao², Yuji S. Takeda³, and Qiaohing Xu⁴
¹Tufts University, Cambridge, MA, ²Tufts University, Medford, MA

Fri–430
In Vivo Incorporation of Non-Canonical Amino Acids to Determine Protein Turnover During Tissue Assembly
Alexander Ocken¹, Sawyer Kieffer¹, Tamara Kinzer-Ursem¹, and Sarah Calve¹
¹Purdue University, West Lafayette, IN

Fri–431
Hairpin DNA Cascade Amplifier for Detection of microRNA in Living Cells
Shan Chen¹, Xiaoxia Hu¹, Lok Ting Chu¹, and Ting-Hsuan Chen¹
¹City University of Hong Kong, Hong Kong, Hong Kong

Fri–432
One-pot Isothermal DNA Extraction and Amplification for the Detection of Enterohemorrhagic E. coli
Sherine Cheung¹, Matthew Yee¹, Nguyen Le¹, Benjamin Wu¹, and Daniel Kamei¹
¹University of California Los Angeles, Los Angeles, CA

Fri–436
Engineering the Next Generation of Lumitoxins
David Nedrud¹ and Daniel Schmidt¹
¹University of Minnesota, Minneapolis, MN

Fri–437
Highly Specific and Modular Affinity Labeling of Epigenetic Modifications
Fanny Wang¹, Osama Zahid¹, and Adam Hall²
¹Virginia Tech-Wake Forest School of Biomedical Engineering, Winston-Salem, NC, ²Wake Forest School of Medicine, Winston-Salem, NC

Fri–438
Sortagging as A Bioconjugation Strategy For In Vitro Compartmentalization Applications
Fredrik W. Sadler¹, Igor Dedevski¹, and Casim A. Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–439
Radioactivity and Mathematical Modeling to Quantify Important Parameters in the Lateral-Flow Immunoassay
Garrett Mosley¹, Phuong Nguyen¹, Benjamin Wu¹, and Daniel Kamei¹
¹University of California Los Angeles, Los Angeles, CA

Fri–440
Mutual Information to Inform Protein Library Design
George Markou¹ and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–441
De Novo Engineering of Site-Specific Protein Binders by Tethering-RD
Igor Dedevski¹, Irena Cich¹, and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–442
Geometry and Expression Enhance Enrichment of Functional Yeast-Displayed Ligands via Cell Panning
Lawrence Stern¹, Ian Schrack¹, Sadie Johnson¹, Aakash Deshpande¹, Nathaniel Bennett¹, Lauren Harasyumi¹, Melissa Gardner¹, and Benjamin Hackel¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–443
An shRNA-Extruding Nanofactory within DNA Origami Nanocapsule
Leo Chou¹, Jaeseung Hahn¹, Rasmus Sorensen¹, and William Shih¹
¹Wyss Institute, Harvard Medical School, Boston, MA

Fri–444
An Atomic Force Microscopy Study of Ebola Virus Host Cell Interaction
Matthew Dragovich¹, Yan Xu¹, Krista Schutt¹, Michelle Sanabria¹, and X. Frank Zhang¹
¹Lehigh University, Bethlehem, PA

Fri–445
Optimization of CRISPR/Cas9 Systems for Treating Cystic Fibrosis with Gene Correction
Mithil Chokshi¹, Ciaran Lee¹, and Gang Bao¹
¹University of Minnesota, Minneapolis, MN

Fri–446
Impacts of Hydrodynamic Conditions on the Initial Phases of Staphylococcus aureus Biofilms and Their Resistance to Antimicrobial Agents
Patrick Ymele-Leki¹
¹Howard University, Washington, DC

Tracks: Cellular and Molecular Bioengineering

Molecular Bioengineering

Fri–433
PAH Afflicted Pulmonary Arteries on-a-Chip to Screen Drugs and Study PAH Pathophysiology
Ahasnul Hasan¹, Ziye Dong², Wei Li³, Amanda Flockton³, Kurt Stenmark⁴, and Fakhruil Ahsan¹
¹Texas Tech University Health Sciences Center, Amarillo, TX, ²Texas Tech University, Lubbock, TX, ³University of Colorado, Aurora, CO

Fri–434
Genome Editing Enabled Generation of Human iPS Cells for Treating Sickle Cell Disease
Ang Li¹, Ciaran Lee¹, So Hyun Park¹, and Gang Bao¹
¹Rice University, Houston, TX

Fri–435
Amperometric Detection of Ultrasound-Induced Secretory Events In Potential Treatment Of Type 2 Diabetes
Bogdan Balteanu¹, Singh Tania¹, Ivan Suarez Castellanos¹, Vesna Zderic¹, and Aleksandar Jeremic¹
¹The George Washington University, Washington, DC

Fri–436
Proteomic Analysis of Exosomes Derived from Neuronal Cells to Determine Factors Promoting Neuronal Differentiation
Do Young Koo¹, Xuewei Zhao², Yuji S. Takeda³, and Qiaohing Xu⁴
¹Tufts University, Cambridge, MA, ²Tufts University, Medford, MA

Fri–437
Radioactivity and Mathematical Modeling to Quantify Important Parameters in the Lateral-Flow Immunoassay
Garrett Mosley¹, Phuong Nguyen¹, Benjamin Wu¹, and Daniel Kamei¹
¹University of California Los Angeles, Los Angeles, CA

Fri–438
Sortagging as A Bioconjugation Strategy For In Vitro Compartmentalization Applications
Fredrik W. Sadler¹, Igor Dedevski¹, and Casim A. Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–439
Geometry and Expression Enhance Enrichment of Functional Yeast-Displayed Ligands via Cell Panning
Lawrence Stern¹, Ian Schrack¹, Sadie Johnson¹, Aakash Deshpande¹, Nathaniel Bennett¹, Lauren Harasyumi¹, Melissa Gardner¹, and Benjamin Hackel¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–440
Mutual Information to Inform Protein Library Design
George Markou¹ and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–441
De Novo Engineering of Site-Specific Protein Binders by Tethering-RD
Igor Dedevski¹, Irena Cich¹, and Casim Sarkar¹
¹University of Minnesota, Minneapolis, MN

Fri–442
Geometry and Expression Enhance Enrichment of Functional Yeast-Displayed Ligands via Cell Panning
Lawrence Stern¹, Ian Schrack¹, Sadie Johnson¹, Aakash Deshpande¹, Nathaniel Bennett¹, Lauren Harasyumi¹, Melissa Gardner¹, and Benjamin Hackel¹
¹University of Minnesota-Twin Cities, Minneapolis, MN

Fri–443
An shRNA-Extruding Nanofactory within DNA Origami Nanocapsule
Leo Chou¹, Jaeseung Hahn¹, Rasmus Sorensen¹, and William Shih¹
¹Wyss Institute, Harvard Medical School, Boston, MA

Fri–444
An Atomic Force Microscopy Study of Ebola Virus Host Cell Interaction
Matthew Dragovich¹, Yan Xu¹, Krista Schutt¹, Michelle Sanabria¹, and X. Frank Zhang¹
¹Lehigh University, Bethlehem, PA

Fri–445
Optimization of CRISPR/Cas9 Systems for Treating Cystic Fibrosis with Gene Correction
Mithil Chokshi¹, Ciaran Lee¹, and Gang Bao¹
¹University of Minnesota, Minneapolis, MN

Fri–446
Impacts of Hydrodynamic Conditions on the Initial Phases of Staphylococcus aureus Biofilms and Their Resistance to Antimicrobial Agents
Patrick Ymele-Leki¹
¹Howard University, Washington, DC
Fri–447
Enhancing Homology-Directed Genome Editing with Orthogonal CRISPR-Cas9 Systems
So Hyun Park¹, Ciaran Lee¹, Harshavardhan Deshmukh¹, and Gang Bao¹
¹Rice University, Houston, TX

Fri–448
In-silico Prediction of CRISPR/Cas9 Cutting Efficiency
Yidan Pan¹, Ciaran Lee¹, Timothy Davis¹, Harshavardhan Deshmukh¹, and Gang Bao¹
¹Rice University, Houston, TX

Fri–449
Determine Protein Interaction Affinity without Protein Purification by Quantitative FRET (qFRET) Technology
Zhehao Xiong¹, Ling Jiang², Raphael Kung¹, Yang Song¹, Yan Liu¹, Amanda Saaredra¹, Songpin Pan¹, and Jiayu Liao¹
¹University of California, Riverside, Riverside, CA

Track: Device Technologies and Biomedical Robotics
Implantable Devices and Implantable Electronics

Fri–450
A Parylene-based Peripheral Nerve Cuff Electrode
Angelica Cobó¹, Kee Schoften¹, Victor Pikov², and Ellis Meng¹
¹University of Southern California, Los Angeles, CA, ²GlaxoSmithKline, London, United Kingdom

Fri–451
Wireless Power and Data Transfer System for Mandibular Distraction Osteogenesis Implants
Deepak Dileepkumar¹, Brent Nowak¹, and Jeffrey Ward¹
¹Grand Valley State University, Grand Rapids, MI

Fri–452
Simple Implantable Wireless Sensor for Monitoring Intracompartamental Pressures
Eric Ledet¹, John Drazan¹, Michael Wassick¹, Khalil Drayton¹, Reena Dahle², Luke Beardslee³, and Nathaniel Cady³
¹Rensselaer Polytechnic Institute, Troy, NY, ²SUNY New Paltz, ³SUNY Polytechnic Institute, Albany, NY

Fri–453
Mechanical Response of Liquid Crystal Polymer Based Magnetic Microactuators for Glaucoma Drainage Device
Hyunsu Park¹, Simon John², and Hyowon Lee¹
¹Purdue University, West Lafayette, IN, ²Howard Hughes Medical Institute, Bar Harbor, ME

Fri–454
Mechanical Responses of Flexible Magnetic Microactuators for Biofoiling Removal
Qi Yang¹, Hyowon Lee¹, and Jeffrey Rhoads¹
¹Purdue University, West Lafayette, IN

Fri–455
Bacteria Removal Capabilities of Polyimide-Based Magnetic Microactuators
Tran Nguyen¹,²,³, Jacqueline Linnes¹, and Hyowon Lee¹,²,³
¹Purdue University, West Lafayette, IN, ²Birck Nanotechnology Center, West Lafayette, IN, ³Center for Implantable Devices, West Lafayette, IN

Track: Device Technologies and Biomedical Robotics
Wearable Sensors and Devices

Fri–456
Wearable Biosensors to Detect Stress Indicators in College Students: A Pilot Study
John La¹, Shirley Cheng¹, Kaikai Liu¹, and Alessandro Bellofiore¹
¹San Jose State University, San Jose, CA

Fri–457
Preliminary Development of PalmSight: Letting the Visually Impaired See using a Hand-Held Device
Alexandra Delazio¹, Zhixuan Yu¹, Samantha Horvath², Jihang Wang³, John Galeotti³, Roberta Klatzky³, and George Stetten³
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

Fri–458
Multiple Sclerosis (MS) Sensory Feedback Device to Improve Pinch Grip
Anastasia Ostrowski¹, Nicole Bettel², Megan White¹, Evan Chen¹, Joshua Cockrum¹, John Gosbee¹, and Rachael Schmedlen¹
¹University of Michigan, Ann Arbor, MI

Fri–459
Use of Electroencephalographic Technology to Predict Blood Glucose Levels Through Brain Activity
Bryce Cranwell¹ and Ricky Castle²
¹East Carolina University, Holly Springs, NC, ²East Carolina University, Greenville, NC

Fri–460
Fabrication of Highly Conductive Hydrogel-patterned Nanofiber for Bioelectronics Device Applications
Dongyoung Heo¹, Junghoon Kim¹, and Lijie Grace Zhang¹
¹The George Washington University, Washington, DC

Fri–461
The Development of a Novel, Flexible, Low Profile, Configurable, Single Point Pressure Sensor
Erika Vandersteen¹, Jane Saviers-Steiger¹, Tomasz Petelenz¹, and Robert Hitchcock¹
¹University of Utah, Salt Lake City, UT

Fri–462
Assessment of Dehydration in the Mouth via Bioimpedance Spectroscopy
Arik Fenstermacher¹ and Gene Fridman²
¹Stevenson University, Baltimore, MD, ²Johns Hopkins University, Baltimore, MD

Fri–463
Battle of the Minds: Entertainment as Proof of Concept Using Affordable EEG and Processing Systems
Alexander Bashqawi¹, James Steele¹, Samuel Dreyer¹, and Hananeh Esmailbeigi¹
¹University of Illinois at Chicago, Chicago, IL

Fri–464
Electromagnetic Resonant Bone Health Sensor Skin Patch for the Detection Of Osteoporosis and Bone Density Changes
Jessica Aldrich¹, Mariam Yassine¹, Nithin Muntimadugu¹, Jeremy Patterson¹, Anil Mahapatro¹, and Kim Cluff¹
¹Wichita State University, Wichita, KS

Fri–465
Tongue-Computer Interface: Assistive Technology for Patients with Paralysis or Limited Hand Function
Richard Hickey¹, Kevin Kerr¹, Vincent Nguyen¹, Ricardo Aranda¹, and Hananeh Esmailbeigi¹
¹University of Illinois at Chicago, Chicago, IL
Fri–466  Towards a Continuous Blood Pressure Monitoring System for Training Scenarios
Devon Griggs¹, Arian Naghibi¹, Manuja Sharma¹, Karinne Barbosa¹, and Hung Cao¹
¹University of Washington, Bothell, WA

Fri–467  Design of a Wearable Electrochemical Sensor for the Detection of Cocaine in Sweat
Orlando Hoilet¹ and Jacqueline Linnes¹
¹Purdue University, West Lafayette, IN

Fri–468  Smartphone Based Fall Risk Assessment Using Dynamic Stability in Healthy individuals
Seong Moon¹, Rahul Soangra¹, Saba Rezvanian¹, Victoria Smith¹, Christopher Frames¹, Markey Olson¹, and Thurmon Lockhart²
¹Arizona State University, tempe, AZ, ²Arizona State University, Mesa, AZ

Fri–469  Can Inertial Sensors Measure Movement Variability in Young and Older Subjects
Rahul Soangra¹ and Thurmon Lockhart²
¹Arizona State University, Mesa, AZ, ²Arizona State University, Tempe, AZ

Fri–470  Consumer Wearable Devices for Health Surveillance and Disease Monitoring
Jessilyn Dunn¹, Xiao Li¹, Denis Salins¹, and Michael Snyder¹
¹Stanford University, Palo Alto, CA

Track: Device Technologies and Biomedical Robotics
Device Technologies and Biomedical Robotics

Fri–471  Sensitivity Analysis for Designing Head Alignment Device for Dental patients during Cone Beam Computer Tomography (CBCT)
Cem Yaba¹, Sinan Onal¹, Sohyung Cho¹, Cyril Pandarakalam², Nathalia Garcia³, and Mohamed Omran⁴
¹Southern Illinois University Edwardsville, Edwardsville, IL, ²Southern Illinois University, School of Dental Medicine, Alton, IL

Fri–472  Fast Response Cart Validation with Traceable Gas Blenders
Jon Moon¹, Christopher Bock², Erica Wohlers¹, Eric Ruud¹, and Yi Liu²
¹MEI Research, Edina, MN, ²Florida Hospital, Orlando, FL

Fri–473  Development of a Scaled Bipedal Robot Using Human Kinematics
Jonathan Mueller¹ and Jaydip Desai¹
¹Indiana Institute of Technology, Fort Wayne, IN

Fri–474  Smart Needle for Epidermal Administration
Michael Oreminger¹, Anastasia Zink¹, Brian Krohn³, and Amit Goyal⁴
¹University of Minnesota Duluth, Duluth, MN, ²University of Minnesota, Minneapolis, MN

Fri–475  Dynamically Controlled PCR Based on Direct Monitoring of Primer and Target Hybridization States
Nicholas Adams¹, William Gabella¹, Austin Hardcastle¹, and Frederick Haselton¹
¹Vanderbilt University, Nashville, TN

Fri–476  Assessing and Reducing the Toxicity of 3D-printed Parts
Shirin Mesbah Oskui¹, Graciel Diamante¹, Chunyang Liao¹, Wei Shi², Jay Gan¹, Daniel Schlenk¹, and William H. Grover¹
¹University of California, Riverside, Riverside, CA, ²Nanjing University, Nanjing, China, People’s Republic of

Fri–477  Demonstration of Proof-of-Concept to Enable Microfluidic Density Gradient Separation of PBMCs from Whole Blood
Yuxi Sun¹ and Palaniappan Sethu¹
¹University of Alabama, Birmingham, Birmingham, AL,
Fri–486
Titanium-Containing Bioactive Glasses for Clinical Applications: Structural Analysis
Omar Rodriguez Perez¹, Declan Curran¹, Marcello Papini¹, Lanis Placek², Anthony Wren³, Emil Schemitsch³, Paul Zalzal⁴, and Mark Towler¹,²,³
¹Ryerson University, Toronto, ON, Canada, ²St. Michael’s Hospital, Toronto, ON, Canada, ³Alfred University, Alfred, NY, ⁴Oakville Trafalgar Memorial Hospital, Oakville, ON, Canada, ⁵University of Malaya, Kuala Lumpur, Malaysia

Fri–487
Effect on Oligosaccharide Grafting on the Conformation and Protonation State of Polyethylenimine
Saswati Basu¹, Danielle Miller¹, Stacy Apugo¹, and Preethi Chandran¹
¹Howard University, Washington, DC

Fri–488
Theranostic Nanoprobes
Tugba Ozel¹, Gabriela Herrera¹, and Tania Betancourt¹
¹Texas State University, San Marcos, TX

Fri–489
Antibiofilm activity of Quaternized Chitosan against Mature Dental Biofilms
Wei Lv¹, Yuyu Sun², and Ying Deng²
¹University of South Dakota, Sioux Falls, SD, ²University of Massachusetts Lowell, Lowell, MA

Fri–490
Clicked Gold Nanoclusters for High Drug Payload and Tumor Targeting through EPR Effect
Wei Mao¹ and Hyuk Sang Yoo¹
¹Kangwon National University, Chuncheon, Korea, Republic of

Fri–491
High-Throughput Screening of Clinically Approved Drugs That Prime PEI Transfection Reveals Modulation of Mitochondrial Dysfunction Response Improves Gene Transfer Efficiencies
Albert Nguyen¹, Jared Beyersdorf¹, Jean-Jack Riethoven¹, and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–492
Size and Surface Characteristics of Silica Nanoparticles Impact CHO Cell Uptake and Viability
Alexander Kelly¹, Kyle Paul¹, Robert Arnold¹, and Allan David¹
¹Auburn University, Auburn, AL

Fri–493
Selective Customization of Preformed Multicomponent Nanoparticles Using Microvortices
Candice Howell¹, Michael Toth¹, and YongTae Kim¹
¹Georgia Institute of Technology, Atlanta, GA

Fri–494
Polyanhydride Nanoparticle Mediates Efficient Killing of Filarial Parasites
Andrea Binnebose¹, Adam Mullis¹, Shannon Haughney¹, Balaji Narasimhan¹, and Bryan Beller¹
¹Iowa State University, Ames, IA

Fri–495
Gelatin Nanoparticle Encapsulation of Anti-Parasitic Compound and Characterization for Treatment of Leishmaniasis Disease
Carlos Serna¹, Alfredo Ornelea¹, Eva Iniguez¹, Katja Michael¹, Rosa Maldonado¹, and Thomas Boland¹
¹The University of Texas at El Paso, El Paso, TX

Fri–496
Synthesis of Structured Microparticles for Tunable, Delayed Protein Release
Dipankar Dutta¹, Chase Fauer¹, Mariama Salifu¹, and Sarah Stabenfeldt¹
¹Arizona State University, Tempe, AZ

Fri–497
Anomalous Drug Transport Through Nanochannels at the Ultra-Nanoscale
Giacomo Bruno¹,², Robert, Lyle Hood³, and Alessandro Grattoni¹
¹Houston Methodist Research Institute, Houston, TX, ²Politecnico di Torino, Turin, Italy, ³The University of Texas at San Antonio, San Antonio, TX

Fri–498
A New Method to Produce Nano-Structured, High Strength, Drug-Eutting Sutures
Kunal Parikh¹, Reza Omidiade¹, Aditya Josyula¹, Richard Shi¹, Abdul Elah Al-Towerkii¹, Youseph Yazdi¹, Peter McDonnell¹, Laura Ensign¹, and Justin Hanes¹
¹Johns Hopkins University, Baltimore, MD, ²King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

Fri–499
Interrogation of Cellular Innate Immunity by Diamond-nanoneedle-assisted Intracellular Molecular Fishing
Zixun Wang¹ and Peng Shi¹
¹City University of Hong Kong, Kowloon, Hong Kong

Fri–500
Establishing Design Criteria for Targeted Nanoparticle Delivery in the Joint
Shannon Brown¹ and Blanka Sharma¹
¹University of Florida, Gainesville, FL

Fri–501
Microneedles Integrated with Pancreatic Cells for Smart Insulin Delivery
Yanqi Ye¹,², Jicheng Yu¹,², Chao Wang¹,², Nhu-Y Nguyen¹, John Buse², and Zhen Gu¹,²
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC, ²University of North Carolina at Chapel Hill, Chapel Hill, NC
**Track: Drug Delivery**

**Drug Delivery**

**Fri–504**  
**Ultrasound-enhanced Drug Delivery for Treatment of Onychomycosis**  
Alina Kline-Schoder, Vesna Zderić, and Zung Li  
1The George Washington University, Washington, DC

**Fri–505**  
**Design and Development for Transdermal Diabetes Drug Delivery System**  
Michaela Rizzo, Daniel Griffin, Sara Colón, Deshawn Gray, Brenden Overton, and Bin Wang  
1Widener University, Chester, PA

**Fri–506**  
**Enhanced Therapeutic Loading and Delivery Via Protonation of Extracellular Vesicles**  
Tak Lamichhane, Eshan Daha, Babita Parajuli, Natalie Livingston, and Steven Jay  
1University of Maryland, College Park, MD

**Track: Nano and Micro Technologies**

**Micro/Nano Fluidic Engineering**

**Fri–508**  
**Streamline Based Design Guideline for Deterministic Microfluidic Hydrodynamic Single Cell Trap**  
Allan Guan, Aditi Shenoy, Richard Smith, and Zhenyu Li  
1George Washington University, Washington, DC

**Fri–509**  
**Design Rules for 3D-Printed Autonomous Capillaric Circuits**  
Ayokunle Olanrewaju and David Juncker  
1McGill University, Montreal, QC, Canada

**Fri–510**  
**Modeling and Validation of Mass Transport in a Microfluidic Vascular Model with On-chip Biosensing**  
Jeremy Wong, Edmond Young, and Craig Simmons  
1University of Toronto, Toronto, ON, Canada

**Fri–511**  
**Development of an Integrated Microfluidic Platform for Automated Proteomic Assay Predictive of Radiotherapy Outcomes**  
Jerome Lacombe, Jerome Solassol, Alain Mange, Matthew Barrett, Alan Nordquist, David Azria, and Frederic Zehausen  
1University of Arizona, Chandler, AZ 2CHU Montpellier, Montpellier, France  3INSERM U1196, Montpellier, France  4ICM Val d’Aurelle, Montpellier, France

**Fri–512**  
**Low Cost Stamping Method for Patterning Multi-Analyte and Ladder-Bar Immunoassays**  
Jessalyn Imdieka and Elain Fu  
1Oregon State University, Corvallis, OR

**Fri–513**  
**Capillary Pressure-Driven Micro-Viscometer to Quantify a Living Zebrafish Fluidic System**  
Juhyun Lee, Dongyang Kang, Nelson Jen, Dino Di Carlo, Yu-Chong Tai, and Tsung Hsiai  
1University of California, Los Angeles, Los Angeles, CA  2California Institute of Technology, Pasadena, CA

**Fri–514**  
**A Self-Contained and Self-Powered Microfluidic Device for Point-of-Care Diagnostics**  
Tae-Hoon Kim and Jungkyu (Jay) Kim  
1Texas Tech University, Lubbock, TX

**Fri–515**  
**High-Throughput Inertial Focusing of Micron and Submicron Particles: from Bacteria to Subcellular Organelles**  
Lei Wang and David Dandy  
1Colorado State University, Fort Collins, CO

**Fri–516**  
**Smartphone-Fluidics Based Microscopy and Flow Cytometry for Islet Quantification**  
ManWai Chan, Yuan Xing, Mohammad Nourmohammadzadeh, Joshua Mendoza Elias, James McGarrigle, Jade Yeh, José Oberholzer, and Yong Wang  
1University of Illinois at Chicago, CHICAGO, IL

**Fri–517**  
**Generation and Detection of An Oxygen Gradient From a Single Source Inside A Microfluidic Platform**  
Md. Dauhn Khan, John Cressman, Paige Epler, and Nitin Agrawal  
1George Mason University, Fairfax, VA

**Fri–518**  
Garrett Benedict, Sarah Fowler, Sarah Wells, Jordan Backer, Paul Carliquist, Scott Evans, Sam Ginsburg, Kathleen Seeley, Evan VanBelle, and Melanie Watson  
1Trine University, Angola, IN

**Fri–519**  
**Affinity-Based Systems for Efficient Cell Separation and Release in Microfluidic Channels**  
Mengen Zhang, Bin Xu, and Wei Shen  
1University of Minnesota, Minneapolis, MN

**Fri–520**  
**Orientation-based Control of Microfluidics**  
Nazila Norouzii, Heran Bhakta, and William H Grover  
1University of California, Riverside, Riverside, CA

**Fri–521**  
**Bi-directional Frequency-tuned Microfluidic Valve**  
Rahil Jain and Barry Lutz  
1University of Washington, Seattle, WA

**Fri–522**  
**Improved Mixing Efficiency Using Convex Grooves In Passive Micro-mixer With Low Reynolds Number Scheme**  
Tae Joon Kwak, Young Gyu Nam, Maria Alejandra Najera, Sang Woo Lee, J. Rudi Strickler, and Woo-Jin Chang  
1Mechanical Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI  2Industrial Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI  3Department of Biomedical Engineering, Yonsei University, Wonju, Korea, Republic of 4Great Lakes Water Institute, University of Wisconsin-Milwaukee, Milwaukee, WI

**Fri–523**  
**Propagating Microvortices to Engineer Drug Loaded High-Density Lipoprotein Mimetic Nanomaterials**  
Yoshitaka Sei and YongTae Kim  
1Georgia Institute of Technology, Atlanta, GA

**Fri–524**  
**A Pumpless Microfluidic Device Driven by Surface Tension for Pancreatic Islet**  
Yuan Xing, Mohammad Nourmohammadzadeh, Joshua Mendoza-Elias, Zequin Chen, James McGarrigle, Jose Oberholzer, and Yong Wang  
1University of Illinois at Chicago, Chicago, IL
Fri–525
Voltage-Controlled Molecular Release from Nanoporous Gold Electrodes in Microfluidic Channel
Zidong Li¹, Ling Wang¹, Ozge Polat¹, and Erkin Seker¹
¹University of California Davis, Davis, CA

Track: Drug Delivery

Nucleic Acid Delivery

Fri–526
Polycation Gene Delivery: Investigation of Opposing Trends in mRNA and Plasmid DNA Transfection
Albert Yen¹, Yilong Cheng¹, Sanyogitta Puri², Katie Barker², and Suzie Pun²
¹University of Washington, Seattle, WA, ²AstraZeneca UK Ltd., Macclesfield, United Kingdom

Fri–527
Dual Peptide-Mediated Targeted Delivery of SiRNAs for the Treatment of Oral Cancer
Angela Alexander-Bryant¹,², Haiven Zhang³, Christopher Attaway³, William Pugh³, Laurence Eggart³, Lu Dinh³, Robert Sansevere³, Lourdes Andino³, and Andrew Jakymiw³,⁴
¹Clemson University, Clemson, SC, ²Medical University of South Carolina, Charleston, SC, ³University of Georgia, Athens, GA, ⁴Case Western Reserve University, Cleveland, OH

Fri–528
Cyto-compatible Catalyst-free Hydrogel for UV-triggered RNA Release to Induce hMSC Osteogenesis
Cong Truc Huynh¹, Minh Khanh Nguyen¹, Zijie Zheng¹, Alexandra McMullan¹, Guler Y. Tonga², Vincent M. Rotello², and Eben Alsberg¹
¹Case Western Reserve University, Cleveland, OH, ²University of Massachusetts, Amherst, MA

Fri–529
Delivery of DNA Probes for Competitive Transcription Factor Antagonism in Pulmonary Fibrosis
Dwight Chambers¹ and Thomas Barker¹
¹University of Tennessee, Knoxville, Knoxville, TN

Fri–530
Chitosan-Zein Nano-in-Microparticles for Oral Gene Delivery
Eric Farris¹, Amanda Ramer-Tait¹, Deborah Brown¹, and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

Fri–531
A Novel Rac1-dependent Endocytic Route for Gene Uptake in Electrotropensation
Mao Mao¹, Liangli Wang¹, Chun-Chi Chang¹, Jianyong Huang¹, and Fan Yuan¹
¹Duke University, Durham, NC

Fri–532
Using Spherical DNA Aptamer-Conjugated Nanoparticles for Personalized Treatment of Small Cell Lung Carcinoma
Ricky Whitener¹, Padma Sundaram¹, Katherine Windham¹, Jacek Wower¹, and Mark Byrne¹
¹Auburn University, Auburn University, AL, ²Rowan University, Glassboro, NJ

Fri–533
Cationic Amphiphilic Copolymer for pTK and GCV Delivery in Spinal Cord Tumor
So-Jung Guw¹, Justin Nice¹, Christian Macks¹, and Jeoung Soo Lee¹
¹Clemson University, Clemson, SC

Track: Drug Delivery

Novel Materials and Self Assembly

Fri–534
Accurate Models of Cell Membranes for In Vitro Screening of Membrane Interactions
Graham Taylor¹ and Stephen Sarles¹
¹University of Tennessee, Knoxville, Knoxville, TN

Fri–535
Integrating Multiple Types of Inorganic Nanoparticles into Biodegradable Polymersomes
Murali Ramamoorthy¹, Sanaz Ebrahimi Samani¹, Simon Tran¹, and Joseph Kinsella¹
¹McGill University, Montreal, QC, Canada

Fri–536
Supramolecular Assemblies of Alkane Functionalized Poly Ethylene Glycol Copolymer for Drug Delivery
Lida Zhu¹ and Katie Bradie¹
¹Iowa State University, Ames, IA

Fri–537
Optically Clear, In-Situ Forming Self-Assembled Nanogels for the Delivery of Ocular Pharmaceutics
Laura Osorno¹, Mark Byrne¹, and Mindy George-Weinstein²
¹Rowan University, Glassboro, NJ, ²Copper Medical School of Rowan University, Camden, NJ

Fri–538
Feasibility of Liposomal Encapsulation Of Complex Black Raspberry Phytochemical Fractions
Lauren Cosby¹, Thomas Knobloch¹, Christopher Weghorst¹, and Robert Lee¹
¹The Ohio State University, Columbus, OH

Fri–539
Stretch Activated Formation of Artificial Model Cell Membranes
Reza Razavi¹ and Stephen Sarles¹
¹University of Tennessee Knoxville, Knoxville, TN

Track: Nano and Micro Technologies

Micro/Nano Sensors

Fri–540
An Impedance-Based Thermal Flow Sensor for Physiological Fluids
Alex Baldwin¹ and Ellis Meng¹
¹University of Southern California, Los Angeles, CA

Fri–541
Enhancing Performance of Enzyme-based Amperometric Biosensors Through Interfacial Engineering
Christian Kotanen¹,² and Anthony Guiseppi-Elie¹,²,³
¹Texas A&M University, College Station, TX, ²Center for Bioelectronics, Biosensors and Biochips (C³B), College Station, TX, ³ABTECH Scientific, Inc., Richmond, VA

Fri–542
Single Cell Analysis Based on Magnetic Beads Assay
Fan Liu¹, Pawan KC¹, Ge Zhang¹, and Jiang Zhe¹
¹The University of Akron, Akron, OH

Fri–543
Molecular Characterization of Hyaluronic Acid (HA) With Solid-State Nanopores
Felipe Rivas¹, Osama Zahid¹, Courtney Smith¹, Elaheh Rahbar¹, and Adam Hall¹
¹Virginia Tech-Wake Forest School of Biomedical Engineering, Winston-Salem, NC
Fri-544 Nanozymes: Next Generation of Artificial Enzymes
Hui Wei¹
¹Nanjing University, Nanjing, China, People's Republic of

Fri-545 Synthesis and Characterization Of Polymer-Coupled Gold Nanorods
Katherine Carrizales¹, Gilbert Bustamante¹, and Jing Yong Ye¹
¹University of Texas at San Antonio, San Antonio, TX

Fri-546 Encapsulated Arrays of Asymmetric Synthetic Lipid Bilayers with in situ Electrical Measurements for Membrane Based Studies
Mary-Anne Nguyen¹ and Stephen Sarles¹
¹University of Tennessee, Knoxville, TN

Fri-547 Integrating Cell-Free Synthetic Biology with Mobile Microfluidics-Based Fluorescent Microscopy to Detect Clinically Relevant Analytes
Mary-Joe Rice¹, John Lake¹, and Warren Ruder¹
¹Virginia Tech, Blacksburg, VA

Fri-548 Hydrogel Microarray: A New System for A Metal Enhanced Fluorescence-Based Protein Assay
Minsu Kim¹, Sang Won Han¹, Haejeong Pang¹, Hye Jin Hong¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

Fri-549 Interference of KCl on Cobalt Nanoparticle-based Electrochemical Low-cost Disposable Phosphate Sensor
Misong Ryu¹ and Woo-Jin Chang¹
¹Mechanical Engineering Department, University of Wisconsin-Milwaukee, Milwaukee, WI

Fri-550 In Vivo Biosensing Via Single Walled Carbon Nanotubes
Nicole Iverson¹, Paul Barone¹, Mia Shandell¹, Laura Trudel¹, Selda Sen², Fatih Sen², Vsevolod Ivanov², Edgardo Farias², Thomas McNicholas², Nigel Reuel², Nicola Parry², Gerald Wogan², and Michael Strano²
¹University of Nebraska Lincoln, Lincoln, NE, ²Massachusetts Institute of Technology, Cambridge, MA

Fri-551 Integration of Flexible Wearable Sensors with Wireless Communication Systems for Health Monitoring
Qiwei Wang¹, Ji Young Lee¹, Teddrick Schaffer¹, Sung Y. Shin¹, and Hyeun Joong Yoon¹
¹South Dakota State University, Brookings, SD

Fri-552 Measuring Extracellular Amino Acid Dynamics from 3T3-L1 Adipocytes Using Online Microdialysis-Capillary Electrophoresis
Rachel Harstad¹ and Michael Bowser¹
¹University of Minnesota, Minneapolis, MN

Fri-553 Hydrogel-framed Nanofiber Matrix Integrated with a Microfluidic based Assay Chip for Fluorescence Detection of Matrix Metalloproteinases-9
Sang Won Han¹, Minsu Kim¹, Kanghee Cho¹, Sung Ho Cha¹, and Won-Gun Koh¹
¹Yonsei University, Seoul, Korea, Republic of

Fri-554 Super-Capacitive Conductive Nanocomposites for Biosensing
Shrishi Singh¹, Maitri Jariwala¹, Osama Altkurtkistani¹, Ankarao Kalluri¹, Prabir Patra¹, Isaac Macwan¹, and Ashish Aaphale³
¹University of Bridgeport, Bridgeport, CT, ²University of Connecticut, Storrs, CT, ³North Carolina State University, Raleigh, NC

Fri-555 Electrochemical Detection of Volatile Organic Compounds (VOCs) associated with Colorectal Cancer via Nickel Functionalized Titania Nanotube Arrays (TNAs)
Anurag Tripathy¹, Dhimant Bhattacharyya¹, Mano Misra¹, and Swomitra Mohanty¹
¹University of Utah, Salt Lake City, UT

Fri-556 Immobilization of Protein-G on Assembled Gold Nanorods for Label-free Detection of Human IgG
Victor Aguero Villarreal¹ and Liang Tang¹
¹The University of Texas at San Antonio, San Antonio, TX

Fri-557 Three-dimensional Mapping and Regulation of Action Potential Propagation
Xiaochuan Dai¹, Wei Zhou², and Charles Lieber¹
¹Harvard University, Cambridge, MA, ²Virginia Tech, Blacksburg, VA

Track: Nano and Micro Technologies

Fri-558 Investigation of Glass Formation Characteristics in Trehalose-water Binary System using Raman Microspectroscopy
Mian Wang¹ and Nilay Chakraborty¹
¹University of Michigan Dearborn, Dearborn, MI

Fri-559 A High-throughput Microfluidic Device for 1000-fold Leukocyte Reduction of Platelet Rich Plasma
Hui Xia¹, Brioryn Strachan¹, Sean Gifford², and Sergey Shevkoplyas¹
¹University of Houston, Houston, TX, ²Halcyon Biomedical Incorporated, Friendswood, TX

Fri-560 Monitoring the Activity of P-glycoprotein Reconstituted in Giant Liposomes
SooHyun Park¹ and Sheereen Majd¹,²
¹Penn State University, University Park, PA, ²University of Houston, Houston, TX

Fri-561 A Simple Culture System for Long Term Imaging of Individual C. Elegans
Will Pittman¹ and Zachary Pincus¹
¹Washington University in St Louis, St. Louis, MO

Track: Stem Cell Engineering

Fri-562 Direct Production of Human Cardiac Tissues by Pluripotent Stem Cell Encapsulation in PEG-Fibrinogen Microspheres
Petra Kerscher¹, Wen Seeto¹, and Elizabeth Lipke¹
¹Auburn University, Auburn, AL

Fri-563 A Regenerative Bio-minipump Created by Cardiac Stem Cells Encapsulated in Thermo-sensitive Microgel
Junnan Tang²,³, Xiaolin Cui4, Michael Hensley¹,³, Adam Vandergriff¹, Jhon Cores¹, Tyler Allen², Phuong-Uyen Dinh³, Jinying Zhang², Hu Zhang⁴, and Ke Cheng¹,³
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC, ²University of Houston, TX, ³First Affiliated Hospital of Zhengzhou University, Zhengzhou, China, People's Republic of, ⁴University of Adelaide, Adelaide, Australia
Track: Stem Cell Engineering

Directing Stem Cell Differentiation

Fri-564
A Computational Model of Hematopoietic Stem Cell Differentiation in Culture
Bhushan Mahadik¹, Bruce Hannon², and Brendan Harley³
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of California Berkeley, Berkeley, CA, ³University of Minnesota, Minneapolis, MN

Fri-565
Arterial Differentiation of Pluripotent Stem Cells Via Modulating Early VE-cad+Nrp+ Endothelial Progenitors
Diana Kim¹ and Guohao Dai¹
¹Rensselaer Polytechnic Institute, Troy, NY

Fri-566
A Customizable Assay to Investigate Parallel & Competing Roles of Microenvironmental Factors on Stem Cell Fate and Behavior
Jayant Sakseña¹, Tian Bao¹, Samuel Charles Sklare¹, Lowry Curley¹, Ben Vinson¹, Tabassum Ahsan¹, and Douglas Chrisey¹
¹Tulane University, New Orleans, LA

Fri-567
Utilizing Genetic Circuits for Enhancing Cell Fate Outcomes
Michael Fitzgerald¹ and Tara Deans¹
¹University of Illinois at Urbana Champaign, Urbana, IL, ²University of Nebraska, Lincoln, NE

Fri-568
Designing a Synthetic Bone Marrow Microenvironment to Drive Adaptive Immunity
Nisarg Shah¹, Angelo Mao¹, Ting-Yu Shih¹, David Mooney¹, and David Scadden¹
¹Harvard University, Cambridge, MA

Fri-569
Role of Dynamic Stiffening on hMSC Differentiation towards Osteogenic or Adipogenic Lineage
Shane Allen¹, Alexis Atequera¹, and Laura Suggs¹
¹The University of Texas at Austin, Austin, TX

Fri-570
MicroRNA-191 Regulates Mesenchymal Stem Cells Differentiation through ZO-1/ZONAB Pathway
Xiao-Fei Zhang¹ and Xiaofeng Cui¹
¹Wuhan University of Technology, Wuhan, China, ²People’s Republic of, ³Stemorgan Therapeutics, Hangzhou, Zhejiang, China

Fri-571
Patterned Porous Silicon Photonics for Integrated Biosensing and Spatial Control of Neural Stem Cell Differentiation
Yi Pei¹, Tiffany Huang¹, Douglas Zhang¹, Yanfen Li¹, and Krishnendu Kilian¹
¹University of Illinois, Urbana, IL

Track: Stem Cell Engineering

Engineering in Developmental Biology

Fri-572
Understanding the Role of Tissue-Level Forces in Mesoderm Specification of Human Embryonic Stem Cells
Jonathon Muncie¹, Laralyne Przybyla¹, Johnathon Lakins¹, Raimon Sunyer², Xavier Trepatic³, and Valerie Weaver²
¹Joint Graduate Group in Bioengineering, UCSF and UC Berkeley, San Francisco, CA, ²University of California San Francisco, San Francisco, CA, ³Institute for Bioengineering of Catalonia, Barcelona, Spain

Poster Viewing with Authors & Refreshment Break | 9:30 am—10:15 am and 3:15 pm—4:00 pm

Fri-573
Engineering Novel Thermoreversible Hydrogels for Large Scale Expansion of Stem Cells
Barbara Ekerdt¹, Christina Fuentes¹, Yuqiu Lei¹, Rachel Segalman¹, and David Schaffer¹
¹University of California Berkeley, Berkeley, CA, ²University of Nebraska, Lincoln, NE, ³University of California Santa Barbara, Santa Barbara, CA

Fri-574
Alignment of hPSC-derived Myogenic Cells in Response to Nanotopographical Cues and Biochemical Ligands
Bin Xu¹, Alessandro Malì², Yoska Anugrah Liu¹, Steven Koester¹, Rita Perlingeiro¹, and Wei Shen¹
¹University of Minnesota, Twin Cities, Minneapolis, MN

Fri-575
Mesenchymal Stem Cell Response to Static Tension, Cyclic Tension, and Vibration
Brooke McClaren¹, Ayeshia Ajia¹, Sneha Mehta¹, and Ronke Olabisi¹
¹Rutgers University, Piscataway, NJ

Fri-576
Engineering the Microenvironment Niche of Human BM derived MSC Spheroids for Enhanced Cardiomyogenesis
Jyotsna Joshi¹, Vincent Beachley², and Chandra Kothapalli³
¹Cleveland State University, Cleveland, OH, ²Rowan University, Glassboro, NJ

Fri-577
Tunable Surface Repellency maintains Stemness and Redox Capacity of Human Mesenchymal Stem Cells
Daniel Balikov¹, Spencer Crowder¹, Tim Boire¹, Jung Bok Lee¹, Mukesh Gupta¹, and Hak-Joon Sung¹
¹Vanderbilt University, Nashville, TN

Fri-578
Alginate Encapsulated Mesenchymal Stromal Cells for Osteoarthritis Treatment
Ileana Marrero-Berrios¹, Rene Schloss¹, and Martin Yarmush¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Fri-579
Investigating the Role of Glycosaminoglycans (GAGs) in Neural Stem Cells (NSCs) Differentiation
Jie Shi Chua¹, Anna Sung¹, and Kuberan Balagurunathan¹
¹University of Utah, Salt Lake City, UT

Fri-580
Algorithm Optimization of Non-DMSO Cryopreservation Protocols Results In Improved Mesenchymal Stem Cell Functionality
Kathryn Pollock¹, Joseph Budenske¹, Elizabeth Moy¹, David H. McKenna², Peter Dosa², and Allison Hubel¹
¹University of Minnesota, Minneapolis, MN, ²University of Minnesota, St Paul, MN

Fri-581
Elucidating the Effect of the Enteric Nervous System on Intestinal Health and Permeability
Marissa Puzani¹ and Abigail Koppes¹
¹Northeastern University, Boston, MA
**Track: Stem Cell Engineering**

**Scaling Up Stem Cell Production/ Stem Cell Derived Progenitors**

Fri–585

Expandable and Rapidly Differentiating Human Induced Neural Stem Cell Lines For Multiple Tissue Engineering Applications

Dana Cairns¹, Karolina Chwalek¹, Yvonne Moore², Matt Kelley², Rosalyn Abbott¹, Stephen Moss³, and David Kaplan¹
¹Tufts University, Medford, MA, ²Tufts University, Boston, MA

Fri–586

Shear Susceptibility of Primary Human Mesenchymal Stem Cells (hMSCs) Increases with Generation Number

Peter Amaya¹, Eric Plencner¹, Peter Rapiejko², and Jeffrey Chalmers¹
¹Ohio State University, Columbus, OH, ²EMD Millipore Corporation, Bedford, MA

**Tracks: Stem Cell Engineering, Cellular and Molecular Bioengineering Stem Cell Programming**

**Fri–587**

Enhancing Nonviral Gene Delivery to Human Mesenchymal Stem Cells Using Glucocorticoid Pathways

Andrew Hamann¹ and Angela Pannier¹
¹University of Nebraska-Lincoln, Lincoln, NE

**Fri–588**

Neutrophil Phenotype Analyzed from Expanded CD34+ Human Umbilical Cord Blood Hematopoietic Stem Cells

Leif Anderson¹, Vasilios Morikis¹, and Scott Simon¹
¹UC Davis, Davis, CA

**Fri–589**

Physical and Chemical Conditions to Promote Differentiation of Human iPSCs to Nucleus Pulposus-like Cells

Ruhang Tang¹, Lufang Jing¹, Vincent Willard², Farshid Guilak¹, Lori Setton¹, and Jun Chen²
¹Washington University in St Louis, St Louis, MO, ²Duke University, Durham, NC

**Fri–590**

High-Throughput Screening of Neurotoxicity on Neural Stem Cell Microarrays

Kyeong-Nam Yu¹, Pranav Joshi¹, Seok-Joon Kwon³, Chandrasekhar Kothapalli¹, and Moo-Yeal Lee¹
¹Cleveland State University, cleveland, OH, ²Rensselaer Polytechnic Institute, Troy, NY

**Track: Tissue Engineering**

**Integration of Developmental Biology and Morphogenesis in Tissue Engineering**

**Fri–597**

A Microphysiological Approach to Elucidate Gene-Environment Interactions in Orofacial Clefting

Brian Johnson¹, Angela Xie¹, Dustin Fink¹, Ross Vitek¹, William Murphy¹, David Beebe¹, and Robert Lipinski¹
¹UW-Madison, Madison, WI

**Fri–598**

Liver-on-a-chip for in vitro Alcoholic Liver Fibrosis Model

JaeSeo Lee¹ and Sang-Hoon Lee¹
¹Korea University, Seoul, Korea, Republic of

**Fri–599**

In-vitro Multi-tissue Interface Model Provides Mechanistic Insight for Vascularizing Tissues

Kevin Buno¹, Xuemei Chen¹, Justin Weibel¹, Stephanie Thiede¹, Suresh Garimella¹, Mervin Yoder¹², and Sherry Voytik-Harbin¹
¹Purdue University, West Lafayette, IN, ²Indiana University School of Medicine, Indianapolis, IN

**Track: Tissue Engineering**

**Inflammation and Immuno modulation**

**Fri–591**

The Effects of Scaffold Rigidity on Retinal Pigment Epithelial Inflammation and Microglial Activation

Corina White¹ and Ronke Olabisi²
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²Rutgers University, Piscataway, NJ

**Fri–592**

Isolation and 3D Culture of Lymph Node Fibroblastic Reticular Cells to Restore Self-tolerance

Freddy Gonzalez Badillo¹, Maria Abreu¹, Vita Manzoli¹, Diana Velluto¹, and Alice Tomei²
¹Diabetes Research Institute-University of Miami-Miller School of Medicine, Miami, FL, ²Department of Biomedical Engineering-University of Miami, Coral Gables, FL, ³Department of Electronics, Information and Bioengineering-Politecnico di Milano, Milano, Italy

**Fri–593**

Dual-Affinity Heparin Hydrogels Achieve Localized Immuno modulation and Enhance Microvascular Remodeling

Molly Ogle¹, Jack Krieger¹, Jennifer McFarlane-Figueroa¹, Johnna Temenoff¹, and Edward Botchwey¹
¹Georgia Institute of Technology, Atlanta, GA

**Fri–594**

Development of a Hemoglobin-Based Treatment to Promote M2 Macrophage Polarization in Inflammation

Paulina Krzyszczak¹, Kristopher Richardson², Martin Yarmush¹, Andre Palmer³, and Francois Berthiaume¹
¹Tufts University, Medford, MA, ²Tufts University, Boston, MA

**Fri–595**

Endothelial Dysfunction Caused By Polarized Macrophages In Atherosclerosis

Radhika Josi¹ and Damir Khismatullin¹
¹Tufts University, New Orleans, LA

**Fri–596**

Engineered PGE2 for Bone Regeneration By Modulating Both Inflammation and Osteogenesis

Yangxi Liu¹, Qingqing Yao¹, and Hongli Sun¹
¹University of South Dakota, Sioux Falls, SD

**Track: Tissue Engineering**

**Scaling Up Stem Cell Production/ Stem Cell Derived Progenitors**

Fri–585

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¹University of Nebraska-Lincoln, Lincoln, NE

**Fri–588**

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Leif Anderson¹, Vasilios Morikis¹, and Scott Simon¹
¹UC Davis, Davis, CA

**Fri–589**

Physical and Chemical Conditions to Promote Differentiation of Human iPSCs to Nucleus Pulposus-like Cells

Ruhang Tang¹, Lufang Jing¹, Vincent Willard², Farshid Guilak¹, Lori Setton¹, and Jun Chen²
¹Washington University in St Louis, St Louis, MO, ²Duke University, Durham, NC

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Kyeong-Nam Yu¹, Pranav Joshi¹, Seok-Joon Kwon³, Chandrasekhar Kothapalli¹, and Moo-Yeal Lee¹
¹Cleveland State University, cleveland, OH, ²Rensselaer Polytechnic Institute, Troy, NY
Track: Tissue Engineering
Printing and Patterning in Tissue Engineering

Fri–600
Tuned Fibroblast Cell Alignment on Polyelectrolyte Nano-wrinkles
Ariel Ash-Shakoor¹, Eric Finkelstein¹, James Henderson¹, and Patrick Mather¹
¹Syracuse University, Syracuse, NY

Fri–601
Design and Engineering of Complex Biological Structures through Micro Extrusion
Geoffrey Navarro¹, Inti Garcia¹, Paul Sundaram¹, and Nanette Diffool¹
¹University of Puerto Rico, Mayaguez, PR

Fri–602
Multiscale 3D Vascular Network Hydrogel Formed by 3D Printing with Sacrificial Fibers
Jung Bok Lee¹, Brian O’Grady¹, Shannon Faley¹, Hak-Joon Sung¹, and Leon Bellan¹
¹Vanderbilt University, Nashville, TN

Fri–603
The Water Soluble Matrix of Nacre Exerts Microspatial Control of Osteogenic Mineralization
Kristopher White¹ and Ronke Olabisi¹
¹Rutgers, The State University of New Jersey, Piscataway, NJ

Fri–604
Evaluation of Printed Cell Viability, Proliferation, and Insulin Production on Various Alginate-Gelatin Hydrogels
Luis Solis¹, Julio Rincon¹, Armando Varela-Ramirez¹, Renato Aguiler¹, and Thomas Boland¹
¹University of Texas at El Paso, El Paso, TX

Fri–605
Feasibility of 3-D Printing for the Replication of Tri-Leaflet Heart Valve Shape
Mohammad Shaver¹, Arvind Agarwal¹, Sara Rengifo¹, and Sharan Ramaswamy¹
¹Florida International University, Miami, FL

Fri–606
Development of Cell-laden Graphene Oxide/ Gelatin Based Bioinks for 3D Bioprinting of Regenerative Tissues
Shayan Shafiei¹ and Tolou Shokuhfar¹
¹University of Illinois at Chicago, Chicago, IL

Fri–607
4D Printing Smart Biomedical Scaffolds with Novel Soybean Oil Epoxidized Acrylate
Shida Miao¹, Wei Zhu¹, Nthan, J Castro¹, Haitao Cui¹, Xuan Zhou¹, John P. Fischer², and Lijie Zhang¹
¹The George Washington University, Washington, DC, ²University of Maryland, College Park, MD

Fri–608
3D Bio-Printed Vascularized Skin Tissue
Vivian Lee¹, Seung-Schik Yoo¹, Pankaj Karande¹, and Guohao Dai²,³
¹Rensselaer Polytechnic Institute, Troy, NY, ²Brigham and Women’s Hospital, Harvard Medical School, Boston, MA, ³Rensselaer Polytechnic Institute, Troy, NY

Fri–609
Rapid Multi-Material Bioprinting
Yu Shrike Zhang¹, Wanjun Liu¹, Marcel Heinrich¹, Fabio De Ferrari¹, Mehmet Dokmeci¹, and Ali Khademhosseini¹
¹Harvard Medical School, Cambridge, MA

Track: Stem Cell Engineering
Stem Cell Technologies for Drug Development

Fri–610
Microengineered Stem Cell-Derived Human Liver Platform for Infectious Disease Applications
Christine Lin¹,² and Salman Khetani²
¹Colorado State University, Chicago, IL, ²University of Illinois at Chicago, Chicago, IL

Fri–611
Fluid Flow Induction of Genes in Human Dermal Fibroblasts -ndash; Engineering a Patient-Specific Drug Screening Platform
Nikita Zabinyakov¹, Deborah Studer¹, Robert Shepherd¹, and Kristina Rinker¹,²
¹University of Calgary, Calgary, AB, Canada, ²Libin Cardiovascular Institute, Calgary, AB, Canada

Fri–612
Recapitulating Stem Cell Therapy for Idiopathic Pulmonary Fibrosis Within Microfluidic Platforms
Matthew Ishahak¹ and Ashutosh Agarwal¹
¹University of Miami, Coral Gables, FL

Fri–613
The Role of Baz and aPKC in Asymmetric Cyst Stem Cell Divisions
Zhinan Wang¹, Wei Shen¹, and Jun Cheng¹
¹University of Illinois at Chicago, Chicago, IL

Track: Translational Biomedical Engineering
Bio-Nanomedicine in Healthcare

Fri–614
Self-Assembled Collagen-mimetic Triple Helices with Anitmicrobial Peptide Amphiphiles as Novel Antibacterial Agents
Kanny (Run) Chang¹, Linlin Sun¹,², and Thomas Webster¹
¹Northeastern University, Boston, MA, ²Wenzhou Institute of Biomaterials and Engineering, Wenzhou, China, People’s Republic of

Fri–615
A BCS Class IIb Drug Dabigatran Exetilaxan Self-nanoemulsifying System to Treat Cardiovascular Disease
Fujian Chai¹, Linlin Sun²,³, Yafei Ding¹, Yajie Zhang¹, and Thomas J. Webster²,³,⁴
¹China Pharmaceutical University, Nanjing, China, People’s Republic of, ²Wenzhou Institute of Biomaterials and Engineering, Wenzhou, China, People’s Republic of, ³Northeastern University, Boston, MA, ⁴King Abdulaziz University, Jeddah, Saudi Arabia

Track: Translational Biomedical Engineering
Translational Approaches for Biomedical Products and Devices

Fri–616
Effects of Gamma Irradiation on the Mechanical and Surface Properties of PTFE
Corayma Duarte¹, Naushadh Wazit², and Gunu Selvadurai¹
¹San Jose State University, San Jose, CA, ²San Jose State University, Fremont, CA
Fri–617  
Aqueous Two-Phase Systems Enhance the Detection of Streptococcus mutans via the Lateral-Flow Immunoassay  
David Pereira¹, Alison Thach¹, Christina Pearce¹, Benjamin Wu¹, and Daniel Kamei¹  
¹UCLA, Los Angeles, CA

Fri–618  
Non-Thermal Plasma Treatment Safely and Rapidly Disinfects MRSA Infected Wounds  
Kerry A. Morrison¹, Rachel Akintayo¹, Julia Jin¹, Ross Weinreb¹, Omer Kaymakcalan¹, Xue Dong¹, Sarah Karinja¹, Andrew Abadeer¹, Lars F. Westblade², Czeslaw Golkowski², and Jason A. Spector¹  
¹Laboratory of Bioregenerative Medicine and Surgery, Division of Plastic Surgery, Weill Cornell Medical College, New York, NY, ²Department of Pathology and Laboratory Medicine, Weill Cornell Medical College, New York, NY, ³Steri Free Med, Inc., Cornell University, Ithaca, NY

Fri–619  
Biomimetic Nanotechnology for Improved Capture of Circulating Tumor Cells  
Seungpyo Hong¹,², Andrew Wang³, Ja Hye Myung¹, Michael Eblan³, and Sin-jung Park¹  
¹University of Illinois, Chicago, IL, ²Yonsei University, Seoul, Korea, Republic of, ³University of North Carolina, Chapel Hill, NC

Fri–620  
Magnetic Levitation Platform for Rapid, On-Site Disease Diagnostics  
Stephanie Knowlton¹, Bekir Yenilmez¹, Chu Hsiang Yu¹, Matthew Heeney⁴, Farzana Pashankar¹, and Savas Tasoglu¹  
¹University of Connecticut, Storrs, CT, ²Harvard Medical School, Boston, MA, ³Yale University School of Medicine, New Haven, CT

Track: Translational Biomedical Engineering  
Translational Approaches for Regenerative Medicine

Fri–621  
Clinical Grade Expansion of Human Intestinal Smooth Muscle Cells using Human Platelet Lysate as a Substitute for Fetal Bovine Serum  
Elie Zakhem¹, Mohammad Z Albanna²,³, and Khalil N Bitar⁴  
¹Wake Forest Institute for Regenerative Medicine, Winston Salem, NC, ²Pinnacle Transplant Technologies, Phoenix, AZ, ³Wake Forest School of Medicine, Winston Salem, NC, ⁴Virginia Tech-Wake Forest University, Winston Salem, NC

Fri–622  
Development of a Quantitative Histology Scale for Capsular Contracture Severity  
Katherine Degen¹, Kurtis Moyer¹,², and Robert Gourdie³  
¹Virginia Tech, Roanoke, VA, ²Carilion Clinic, Roanoke, VA, ³Virginia Tech Carilion Research Institute, Roanoke, VA
SATURDAY’S HIGHLIGHTS

Platform Sessions–Sat-1
8:00 am—9:30 am  Convention Center
See pages 197-205
Meet the Expert: Meet the Experts on Data Sharing
8:00 am—9:30 am  Room 204
See page 205
Exhibit Hall Open
9:30 am—5:00 pm  Exhibit Hall
Poster Session
9:30 am—1:00 pm  Exhibit Hall
Poster Viewing with Authors & Refreshment Break
9:30 am—10:15 am  Exhibit Hall
Plenary Session
10:30 am—11:30 am  Auditorium

Rita Schaffer Young Investigator Lecture
Jennifer Munson, PhD

BMES Diversity Lecture Award
Srinivas Sridhar, PhD

OP-Sat-1-1  Auditorium 1
Track: Cellular and Molecular Bioengineering
Mechanobiology of Cell Adhesion I

8:00 am
Cells Feel the Force, Then They Don’t: Implications in Wound Repair and Fibrosis –INVITED
Thomas Barker¹
¹University of Virginia, Charlottesville, VA

8:15 am
Physical Determinants of the Subcellular Distribution of Vinculin Tension
Andrew LaCroix¹ and Brenton Hoffman¹
¹Duke University, Durham, NC

8:30 am
Provisional Matrix Citrullination Contributes to Aberrant Wound Healing
Victoria Stefanelli¹, Kelly Pesson¹, and Thomas Barker²
¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA

8:45 am
Anisotropic Traction Forces from Spatially Constrained Focal Adhesions Drive Contact-guided Cell Migration
Arja Ray¹, Oscar Lee², Zaw Win¹, Rachel Edwards¹, Patrick Alford¹, Deok-Ho Kim², and Paolo Provenzano¹
¹University of Minnesota, Twin Cities, Minneapolis, MN, ²University of Washington, Seattle, Seattle, WA

9:00 am
Obesity-associated ECM Remodeling Promotes Proangiogenic Endothelial Cell Behavior
Lu Ling¹, Bo Ri Seo¹,², Andrew J Dannenberg³, and Claudia Fischbach-Teschl¹
¹Cornell University, Ithaca, NY, ²Harvard University, Cambridge, MA, ³Weill Cornell Medical College, New York City, NY

9:15 am
Contractile Fibroblasts Activate an Extracellular Integrin "Switch" Implicated in Fibrotic Progression
John Nicosia¹, Lizhi Cao², Jacqueline Larouche¹, and Thomas Barker¹
¹Georgia Institute of Technology, Atlanta, GA, ²Biogen Idec, Cambridge, MA, ³University of Virginia, Charlottesville, VA

Saturday, October 8 | 8:00 am–9:30 am | Platform Session 1

Minneapolis | BMES 2016
Saturday, October 8 | 8:00 am–9:30 am | Platform Session 1

**OP-Sat-1-2**  
**Auditorium 2**  
**Track: Cancer Technologies**

**Cancer Drug Delivery**

*Chairs: Michael King, Walter Murfee*

**8:00 am**  
Chitosan/Poly(lactide) Drug-loaded Nanoparticles for Breast Cancer Therapy  
Rupali Hire¹ and Cheryl Gomillion¹  
¹University of Georgia, Athens, GA

**8:15 am**  
Halofuginone as a Stroma-targeted Therapy Agent in Pancreatic Ductal Adenocarcinoma  
Kianna Elahi Gedwillo¹, Marjorie Carlson¹, and Paolo Provenzano¹  
¹University of Minnesota, Minneapolis, MN

**8:30 am**  
PolyDots for Glioblastoma: Drug Delivery, Release, and Distribution  
Mark Calhoun¹, Gauri Nabari², Jihong Xu³, Alessandra Welker², Vinay Puduval³, and Jessica Winter²  
¹The Ohio State University, Columbus, OH, ²OSU, Columbus, OH

**8:45 am**  
A Bi-directional, Light-based Combination Therapy For Pancreatic Cancer  
Huang-Chiao Huang¹, Imran Rizvi², Joyce Liu¹, Ashish Kalra², Helen Lee², Jaeyeon Kim², Jonathan Fitzgerald², and Tayyaba Hasan¹  
¹Massachusetts General Hospital and Harvard Medical School, Boston, MA, ²Merrimack Pharmaceuticals, Inc., Cambridge, MA, ³Harvard University and Massachusetts Institute of Technology, Cambridge, MA

**9:00 am**  
Irridation of Bladder Cancer via Targeted Carbon Nanotubes for Photothermal Therapy  
Needa Virani¹, Carole Davis², Paul Hauser³, Robert Hurst³, Joel Slaton³, and Roger Harrison¹  
¹University of Oklahoma, Norman, OK, ²University of Oklahoma Health Sciences Center, Oklahoma City, OK, ³Baylor, Waco, TX

**9:15 am**  
Filomicelles Self-assembled From Degradable Di-block Copolymers Deliver Retinoids and Chemotherapeutics in Durable Control of Carcinoma Cell Fate  
Praful Nair¹ and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA

**OP-Sat-1-3**  
**Auditorium 3**  
**Track: Translational Biomedical Engineering**

**Clinical Translation of Engineered Tissues**

*Chairs: Pinar Zorlutuna, Milica Radisic*

**8:00 am**  
Clinical Translation of Engineered Tissues: Bedside to Bench and Back—INVITED  
Michael Yaszemski¹  
¹Mayo Clinic, Rochester, MN

**8:30 am**  
“Off-the-Shelf” Tissue-Engineered Vascular Graft with Growth Potential for Pediatric Application  
Zeeshan Syedain¹, Jay Reimer¹, Mathew Lahti¹, James Berry¹, and Robert Tranquillo¹  
¹University of Minnesota, Minneapolis, MN

**8:45 am**  
Enhancing Regulatory Review of Computational and Mathematical Modeling and Simulation for Regenerative Medicine Products  
Ryan Ortega¹, Tina Morrison¹, Brian Pullin¹, and Alex Bailey¹  
¹Food and Drug Administration, Silver Spring, MD

**9:00 am**  
FGF-8 and TGF-2 Effects on Ligamentous Formation for Bioengineered ACL Matrices  
Paulos Mengsteab¹,², Lakshmi Nair¹,²,³, and Cato Laurencin¹,²,³  
¹University of Connecticut, Storrs, CT, ²University of Connecticut Health, Farmington, CT, ³University of Connecticut, Farmington, CT

**9:15 am**  
New Retina Reattachment Procedure Based on Magnetic Field Force on Biocompatible Superparamagnetic Nanoparticles Injected in the Eye  
Orlando Auciello¹, Mario Saravia², Pablo Gurman¹, Roberto Zysler³, and Alejandro Berra⁴  
¹University of Texas at Dallas, Richardson, TX, ²Hospital Austral, Buenos Aires, Argentina, ³CONICET, Bariloche, Argentina, ⁴University of Buenos Aires, Buenos Aires, Argentina

**OP-Sat-1-4**  
**Room 102AB**  
**Track: Biomaterials**

**Biomaterials for Immunoengineering IV**

*Chairs: Chandra Kothapalli, Daniel Alge*

**8:00 am**  
Hydrophilicity Provides Translatable Regulation of Immune Response to Biomaterials  
Kelly Hotchkiss¹, Victor Garcia-Perez¹, and Rene Olives-Navarrete¹  
¹Virginia Commonwealth University, Richmond, VA
8:15 am
Effects of Extracellular Matrix and Cytokine Microenvironment on Macrophage Migration
Tim Smith¹, Jessica Hsieh¹, and Wendy Liu¹
¹University of California, Irvine, Irvine, CA

8:30 am
Localised Control of T Cell Activation Using Biodegradable Artificial Antigen Presenting Cells
Derfogail Delcassian¹,², Omar Qutachi¹, and Kevin Shakesheff¹
¹University of Nottingham, Nottingham, United Kingdom, ²MIT, Cambridge, MA

8:45 am
Interaction of Macrophages with Different Topographies of Polytetrafluoroethylene
Sujan Lamichhane¹, Jordan Anderson¹, Tyler Remund², Hongli Sun¹, Mark Larson³, Patrick Kelly⁴, and Gopinath Mani¹
¹The University of South Dakota, Sioux Falls, SD, ²Sanford Research, Sioux Falls, SD, ³Augustana University, Sioux Falls, SD, ⁴Sanford Health, Sioux Falls, SD

9:00 am
Nanomaterials-based Vaccines against Cocaine Addiction
Joshua Snook¹, Ye Ding¹, Harshini Neelakantan¹, Haiying Chen¹, Jia Zhou¹, Kathryn Cunningham¹, and Jai Rudra¹
¹University of Texas Medical Branch, Galveston, TX

9:15 am
Engineering Antioxidant Nanoscale Layer-by-Layer Coatings for Islet Transplantation
Nicolas Abuid¹, Kerim Gattas-Asfura¹, Ethan Yang², Mike Valdes², and Cherie Stabler¹
¹University of Florida, Gainesville, FL, ²University of Miami, Miami, FL

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

OP-Sat-1-5  Room 102C
Track: Cardiovascular Engineering

Cardiac Electrophysiology
Chairs: Daniel Conway, Karen May-Newman

8:00 am
Probing the Effects of MYBPC3 Truncating Mutations Using Computational Models and Engineered Human Myocardium—INVITED
Jonas Schwan¹, Yongming Ren¹, Yiping Qyang¹, and Stuart Campbell¹
¹Yale University, New Haven, CT

8:15 am
Ion Channel Expression and Distribution are Modulated by Phosphorylation of Focal Adhesion Kinase
Swarnali Bjergaard¹, Brenton Hoffman¹, and Nenad Bursac¹
¹Duke University, Durham, NC

8:30 am
Improved Cardiac Function by Chronic Activation of Hypothalamic Oxytocin Neurons in a Rat Model of Heart Failure
Kara Garrott¹, Edmund Cauley¹, Sarah Kuzmiak-Glancy¹, Xin Wang¹, David Mendelowitz¹, and Matthew Kay¹
¹The George Washington University, Washington, DC

8:45 am
Extracellular Matrix Regulation of Conduction Velocity in Engineered Cardiac Tissues
Andrew Petersen¹, Davi Lyra-Leite¹, Nethika Ariyasighe¹, Nathan Cho¹, Joon Young Kim¹, and Megan McCain¹
¹University of Southern California, Los Angeles, CA

9:00 am
Intercalated Disk Localization of the Inward Rectifier Current (IK1) Modulates Cardiac Conduction
Seth Weinberg¹, Swarnali Bjergaard¹, and Nenad Bursac²
¹Old Dominion University, Suffolk, VA, ²Duke University, Durham, NC

9:15 am
Novel Multiscale Entropy Approach for Rotor Pivot Point Identification
Shivaram Poigai Arunachalam¹, Elizabeth Annoni¹, and Elena Tolkacheva¹
¹University of Minnesota, Minneapolis, MN

OP-Sat-1-6  Room 101A
Track: Cellular and Molecular Bioengineering

Cancer Cell Motility and Migration
Chairs: Kristen Mills, Jennifer Munson

8:00 am
The Hypoxic Tumor Microenvironment Alters CXCR4 Expression and Collective Cell Migration of Breast Tumor Cells
Priscilla Hwang¹ and Steven George¹
¹Washington University in St Louis, St Louis, MO

8:15 am
Podocalyxin Promotes Migration of Pancreatic Cancer Cells by Altering Cytoskeletal Dynamics
Bin Sheng Wong¹, Daniel Shea¹, Robert Law¹, and Konstantinos Konstantopoulos¹
¹Johns Hopkins University, Baltimore, MD

8:30 am
Metastatic Migration in Microtracks is Mediated by Cell Polarization through Girdin
Aniqua Rahman¹, Shuo Shan¹, and Cynthia Reinhart-King¹
¹Cornell University, Ithaca, NY
Platform Session 1

Saturday, October 8 | 8:00 am–9:30 am | Platform Session 1

8:45 am
Characterization of Cancer Cell Confined Migration in Embryonic Zebrafish and Microchannels
Colin Paul1, Alexus Devine1, and Kandice Tanner1
1National Cancer Institute, Bethesda, MD

9:00 am
Migration Against the Direction of Shear Flow is LFA-1 Dependent in Human Hematopoietic Stem Cells
Alexander Buffone, Jr.1, Nicholas Anderson1, and Daniel Hammer1
1University of Pennsylvania, Philadelphia, PA

9:15 am
Metabolic Signaling Crosstalk Promotes Brain Cancer Progression
Sanjana Ranganathan1, Ka Wai Lin1, Angela Liao1, and Amina Qutub1
1Rice, Houston, TX

OP–Sat–1–7 Room 101B

Track: Cardiovascular Engineering

Computational Modeling in Cardiovascular Systems I

Chairs: Ranjan Dash, Sharan Ramaswamy

8:00 am
Quantitative + Computational Biology: Towards Directed Control of Neovascularization—INVITED
Princess Imoukhuede1
1University of Illinois Urbana Champaign, Urbana, IL

8:30 am
In Silico Organ-Level Modeling of Infarcted Myocardium and Cardiac Function Impairment
Joao S. Soares1, David S. Li1, Samarth Raut1, Joseph H. Gorman III2, Robert C. Gorman2, and Michael S. Sacks1
1University of Texas at Austin, Austin, TX, 2University of Pennsylvania, Philadelphia, PA

8:45 am
Assessment of Organ-Scale Left Ventricular Mechanics and Physiology using a Cellular-Based Active Contraction Model
Sheikh Mohammad Shavik1, Joakim Sundnes2, Samuel Wall1, Daniel Burkhoff2, and Lik Chuan Lee1
1Michigan State University, East Lansing, MI, 2Simula Research Laboratory, Oslo, Norway, 3Columbia University, New York, NY

9:00 am
Fluid Dynamics Effect of Peristalsis-like Right Ventricular Wall motion in 20 Weeks Old Human Fetuses
Hadi Wiputra1, Khong Chun Chua1, Nivetha Raju1, Hwa Liang Leo1, and Choon Hwai Yap1
1National University of Singapore, Singapore, Singapore

9:15 am
Using Graph Theory to Predict Ablation Targets in Patient Specific Models of Left Atrial Flutter
Erica Schwarz1, Sohail Zahid1, Kaitlyn Whyte1, Patrick Boyle1, Jonathan Chrispin2, Robert Blake2, Adityo Prakosa1, Esra Ipak1, Henry Halperin2, Hugh Calkins3, Ronald Berger3, Saman Nazarian4, and Natalia Trayanova1
1Johns Hopkins University, Baltimore, MD, 2Johns Hopkins Hospital, Baltimore, MD, 3CardioSolv Ablation Technologies, Baltimore, MD

OP–Sat–1–8 Room 101C

Track: Tissue Engineering

Integration of Developmental Biology and Morphogenesis in Tissue Engineering

Chairs: Lauren Black III, Kelly Stevens

8:00 am
Engineering CNS Tissue Morphogenesis In Vitro—INVITED
Gavin Knight1,2, Carlos Marti-Figueroa1,2, Jason McNulty1,2, Jake Tokar1,3, Ethan Lippmann1,2, David Beebe1,3, Lih-Sheng Turner2, and Randolph Ashton1,2
1University of Wisconsin Madison, Madison, WI, 2Wisconsin Institute for Discovery, Madison, WI, 3Wisconsin Institutes for Medical Research, Madison, WI

8:30 am
Architectural Cues Mediate Engineered Human Liver Tissue Expansion In Vivo
Kelly Stevens1, Chelsea Fortin1, Margaret Scull2, Vyas Ramanan3, Christopher Chen4, Charles Rice5, and Sangeeta Bhatia1
1University of Washington, Seattle, WA, 2Rockefeller University, New York, NY, 3Massachusetts Institute of Technology, Cambridge, MA, 4Boston University, Boston, MA

8:45 am
FGF8-mediated Tensional Gradients Drive Collective Cell Movements During Early Endoderm Morphogenesis
Nandan Nerurkar1, L Mahadevan2, and Cliff Tabin1
1Harvard Medical School, Boston, MA, 2Harvard University, Cambridge, MA

9:00 am
Directed Folding of Synthetic Biological Tissues Via Programmed Cellular Contractility
Alex Hughes1, Max Coyle1, Jesse Zhang1, and Zev Gartner1
1University of California, San Francisco, San Francisco, CA

9:15 am
A Method to Characterize Extracellular Matrix Composition and 3D Structure During Embryonic Development
Michael Drakopoulos1 and Sarah Calve1
1Purdue University, West Lafayette, IN
### OP-Sat-1-10  Room 101E

**Track: Biomaterials**

**Hydrogel Biomaterials I**

**Chairs:** Jamal Lewis, Janet Zoldan

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
</tr>
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<tbody>
<tr>
<td>8:00 am</td>
<td>Temporally Controlled Release of Platelet-Rich Plasma from Biodegradable PEG Microgels</td>
<td>Era Jain¹, Saahil Sheth¹, Scott Sell², and Silviya Zustiak¹</td>
<td>Saint Louis University, Saint Louis, MO</td>
</tr>
<tr>
<td>8:15 am</td>
<td>PPS-based, Thermoresponsive Hydrogels Protect Primary Human Pancreatic Islets from Cytotoxic ROS</td>
<td>Bryan Dollinger¹, Mukesh Gupta¹, John Martin¹, Nicolas Vierra¹, David Jacobson¹, and Craig Duvall¹</td>
<td>Vanderbilt University, Nashville, TN</td>
</tr>
<tr>
<td>8:30 am</td>
<td>MMP-Triggered Activation of Mammalian Genetic Circuits in Recombinant Protein Hydrogels</td>
<td>Mitchell Weisenberger¹, Martin Jensen¹, Hamid Ghandehari¹, and Tara Deans¹</td>
<td>University of Utah, Salt Lake City, UT</td>
</tr>
<tr>
<td>8:45 am</td>
<td>Analysis of Gellan Hydrogel Drug Release Kinetics and Rheological Properties</td>
<td>Shashank Shukla¹, Anubhav Tripathi¹, and Anita Shukla¹</td>
<td>Brown University, Providence, RI</td>
</tr>
<tr>
<td>9:00 am</td>
<td>A Biodegradable, Thermally Responsive Injectable Hydrogel with Reactive Oxygen Species Scavenging Effect</td>
<td>Yang Zhu¹,², Murugesan Velayutham¹, Yasumoto Matsumura¹, and William Wagner¹,²,³,⁴</td>
<td>McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, Department of Surgery, University of Pittsburgh, Pittsburgh, PA, Department of Chemical Engineering, University of Pittsburgh, Pittsburgh, PA</td>
</tr>
<tr>
<td>9:15 am</td>
<td>Development of Smart Responsive Hydrogel Vehicles for Controlled Delivery of Analgesics</td>
<td>Liangju Kuang¹, Nurul Sulimai¹, Mario Cano-Vage¹, Jeff Ko¹, Gert Breur¹, and Meng Deng¹</td>
<td>Purdue University, West Lafayette, IN</td>
</tr>
</tbody>
</table>

* **Biomaterials Track sponsored by** ACS Biomaterials Science & Engineering

### OP-Sat-1-11  Room 200E

**Track: Nano and Micro Technologies**

**Applications of Nanopores and Nanoparticles**

**Chairs:** Adam Hall, Alptekin Aksan

<table>
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<tr>
<th>Time</th>
<th>Title</th>
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<th>Institution</th>
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<tbody>
<tr>
<td>8:00 am</td>
<td>Biofouling-Resilient Nanoporous Gold Electrodes for Electrochemical DNA Detection</td>
<td>Pallavi Daggumati¹, Zimple Matharu¹, Ling Wang¹, and Erkin Seker¹</td>
<td>University of California, Davis, Davis, CA</td>
</tr>
<tr>
<td>8:15 am</td>
<td>Selective Detection of miRNAs and Other Sequence Biomarkers with Solid-State Nanopores</td>
<td>Osama K. Zahid¹, Fanny Wang¹, and Adam R. Hall¹,²</td>
<td>Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC, Comprehensive Cancer Center of Wake Forest University, Winston-Salem, NC</td>
</tr>
<tr>
<td>8:30 am</td>
<td>Nanowarming of Tissues</td>
<td>Zhe Gao¹, Navid Manuchehrabadi¹, Jinjin Zhang¹, Hattie Ring¹, Qi Shao¹, Feng Liu¹, Michael McDermott¹, Kelvin Brockbank²,³, Michael Garwood¹, Christy Haynes¹, and John Bischof¹</td>
<td>University of Minnesota, Minneapolis, MN, Tissue Testing Technologies LLC, North Charleston, SC, Clemson University, Clemson, SC</td>
</tr>
<tr>
<td>8:45 am</td>
<td>Chitosan-coated Selenium Nanoparticles for the Selective Inhibition Bacteria Growth</td>
<td>Michelle Stolzoff¹, Nicholas de la Torre¹, and Thomas J Webster¹</td>
<td>Northeastern University, Boston, MA</td>
</tr>
<tr>
<td>9:00 am</td>
<td>Accurate Detection of Serum Biomarkers Using Iron Oxide Nanoparticle-linked Immunosorbent Assay</td>
<td>Linlin Zhang¹, Sheng Tong¹, and Gang Bao¹</td>
<td>Rice University, Houston, TX</td>
</tr>
<tr>
<td>9:15 am</td>
<td>Electrically-Guided DNA Printing and Multiplexed DNA Detection with Nanoporous Gold Electrodes in Microfluidic Device</td>
<td>Zidong Li¹, Pallavi Daggumati¹, Ling Wang¹, and Erkin Seker¹</td>
<td>University of California Davis, Davis, CA</td>
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*ACS Biomaterials Science & Engineering*
Applications of MRI and Focused Ultrasound

8:00 am
Non-Invasive Ultrasound Liver Ablation using Histotripsy: Chronic Study in an In Vivo Rodent Model

Eli Vlaisavljevich1, Joan Greve1, Xu Cheng1, Kimberly Ives1, Jiaqi Shi1, Tim Hall1, Theodore Welling1, Gabe Owens1, William Roberts1, and Zhen Xu1
1University of Michigan, Ann Arbor, MI

8:15 am
MR Image-Guided Delivery of Non-Viral miRNA-34a Gene Vectors via Focused Ultrasound Inhibits Tumor Growth in a Mouse Glioma Model

Colleen Curley1, Ying Zhang1, Karina Negron2, G. Wilson Miller1, Alexander Klibanov1, Roger Abounader1, Jung Soo Sük2, Justin Hanes1, and Richard Price1
1University of Virginia, Charlottesville, VA, 2Johns Hopkins University, Baltimore, MD

8:30 am
Characterization of Uterine Fibroid Tissue Properties for MRgFUS Thermal Therapies

Christopher Dillon1, Margit Janát-Amsbury1, and Allison Payne1
1University of Utah, Salt Lake City, UT

8:45 am
High Sensitivity Magnetic Resonance Thermometry of Focused Ultrasound Heating—INVITED

Wilson Miller1 and Yuan Zheng1
1University of Virginia, Charlottesville, VA

9:00 am
Focused Ultrasound Blood Brain Barrier Disruption Enables Non-invasive Delivery of Contrast Agents for Multiscale Imaging of the Brain

Robin Hartman1,2, Flor Medina1, R. Andrew Fowler1, Kristina Hallam1, S. M. Shams Kazmi1, Stanislav Emelianov2,3, and Andrew Dunn1
1University of Texas at Austin, Austin, TX, 2Georgia Institute of Technology, Atlanta, GA, 3Georgia Institute of Technology and Emory University School of Medicine, Atlanta, GA

9:15 am
Monte Carlo Simulation of Laser Speckle Contrast Imaging of Perfusion in the Skin

Caitlin Regan1, Carole Hayakawa1, Vasan Venugopalan1, and Bernard Choi1
1University of California, Irvine, Irvine, CA

9:30 am
Optical Imaging of Membrane Potential in the In Situ Stomach

Hanyu Zhang1, Joshua Hughes2, Jack Price1, Niranchan Paskarananadavadel1, Gregory Walcott1, Greg O’Grady1, Leo Cheng1, and Jack Rogers1
1University of Alabama at Birmingham, Birmingham, AL, 2Johns Hopkins University, Baltimore, MD, 3University of Auckland, Auckland, New Zealand

9:45 am
Automation of Collagen Birefringence Imaging at Multiple Polarization Angles

Jade Montgomery1,2 and Robert Gourdie1,2
1Virginia Tech, Blacksburg, VA, 2Virginia Tech Carilion Research Institute, Roanoke, VA

Track: Stem Cell Engineering

Pluripotent Stem Cell Engineering

Chairs: Gulden Camci-Unal, Hossein Tavana

8:00 am
Mechanical Modulation of Mesodermal Differentiation—INVITED

Taby Ahsan1
1Tulane University, New Orleans, LA
8:30 am
Matrix Tension Directs Tissue-level Organization to Prime Embryonic Stem Cells for Differentiation
Laralynne Przybyla1, Johnathon Lakins1, Jonathon Muncie1,2, and Valerie Weaver1
1University of California San Francisco, San Francisco, CA, 2University of California Berkeley, Berkeley, CA

8:45 am
Mechano-modulation of E-cadherin Clustering Regulates Early-Stage Differentiation of Human Pluripotent Stem Cells
Maricela Maldonado1, Gerardo Ico1, Rebekah Luu1, and Jin Nam1
1University of California, Riverside, CA

9:00 am
NANOG Restores the Effects of Senescence on Extracellular Matrix Deposition
Na Rong1, Panagiotis Mistriotis2, Xiaoyan Wang1, Georgios Tseropoulos1, and Stelios Andreadis1
1University of New York at Buffalo, Buffalo, NY

9:15 am
Directing the Cancer Stem Cell State through Interface Engineering
Junmin Lee1 and Kristopher Kilian1
1University of Illinois at Urbana-Champaign, Urbana, IL

8:45 am
Non-covalent Functionalization of Single Wall Carbon Nanotubes with Engineered Proteins for Targeted Subcellular Delivery
Kris Dahl1 and Mohammad Islam1
1Carnegie Mellon University, Pittsburgh, PA

9:00 am
Optimizing Nanoparticle Platforms to Penetrate Colorectal Mucosa for Rectal Pre-Exposure Prophylaxis (PrEP) for HIV
Antoinette Nelson1, Dan Myers1, Jennifer Holloway1, Xiaoping Zhang1, Zoltan Szekely1, and Patrick Sinko1
1Rutgers University, Piscataway, NJ

9:15 am
Controlled Delivery of Lentivectors via Micropatterned Hydrogels
Justin Madrigal1, Roberta Stilhano2, Christian Siltanen1, Kimberly Tanaka1, Alexander Revzin1, Sang Won Han1, and Eduard Silva1
1University of California Davis, Davis, CA, 2Federal University of São Paulo, São Paulo, Brazil

OP-Sat-1-15 Room 200C
Track: Drug Delivery
Nano to Micro Devices in Drug Delivery

8:00 am
Microscale Devices Sealed with Nanostraw Membranes for Oral Drug Delivery
Cade Fox1, Yuhong Cao2, Cameron Nemeth1, Hariharasudhan Chirra1, Rachel Chevalier1, Alexander Xu2, Nicholas Melosh1, and Tejal Desai1
1University of California, San Francisco, San Francisco, CA, 2Stanford University, Stanford, CA

8:15 am
Injectable Microfabricated Particles with Pulsatile Release Kinetics
Kevin McHugh1, Thanh Nguyen1, Allison Linehan1, David Yang1, Stephanhy Tzeng1, Adam Behrens1, Jennifer Lu1, Zachary Tochka1, Svatlana Rose1, Austin Wang1, Robert Langer1, and Ana Jaklenec1
1Massachusetts Institute of Technology, Cambridge, MA

8:30 am
IL4 Conjugated Gold Nanoparticles Direct Macrophage Polarization <i>In Vivo</i>
Following Ischemia Surgery
Theresa Raimondo1 and David Mooney1
1Harvard University, Cambridge, MA
9:00 am  
**Can Ultrasound Activate Nerves In Vivo?**  
Hongsun Guo¹, Mark Hamilton¹, Sarah Offutt², Yohan Kim²,  
Cory Gloeckner¹, Jamu Alford², and Hubert Lim¹  
¹University of Minnesota, Minneapolis, MN,  
²Medtronic, Minneapolis, MN

9:15 am  
**Transcranial Direct Current Stimulation Transiently Increases the Blood-Brain Barrier Solute Permeability In Vivo**  
Da Wi Shin¹, Niranjan Khadka¹, Jie Fan¹, Marom Bikson¹,  
and Bingmei Fu¹  
¹The City College of the City University of New York, New York, NY

**Track: Neural Engineering**  
**Neural Progenitor and Stem Cell Engineering**  
**Chairs:** Randolph Ashton, Shelly Sakiyama-Elbert

8:00 am  
**Acutely-activated Microglia Differentially Regulates Neural Stem Cell Phenotype and Genotype**  
Kurt Farrell¹ and Chandra Kothapalli¹  
¹Cleveland State University, Cleveland, OH

8:15 am  
**Optimizing Label-free Human Neural Stem Cell Sorting Using 3D Dielectrophoresis**  
Tayloria Adams¹, Clarissa Ro¹, Nicolo Mendoza¹,  
Stephen Flynn¹, Jamison Nourse¹, and Lisa Flanagan¹  
¹University of California Irvine, Irvine, CA

8:30 am  
**The Social Networks of Neural Progenitor Cells**  
Arun Mahadevan¹, Jacob Robinson¹, and Amina Qutub¹  
¹Rice University, Houston, TX

8:45 am  
**The Effect of Peptide Affinity in Neural Progenitor Cell Mechano-sensing**  
Jessica Stukel¹ and Rebecca Willits¹  
¹University of Akron, Akron, OH

9:00 am  
**Engineering Organotypic Spinal Cord Slice Cultures from Human Pluripotent Stem Cells**  
Gavin Knight¹² and Randolph Ashton¹²  
¹University of Wisconsin-Madison, Madison, WI,  
²Wisconsin Institute for Discovery, Madison, WI
9:03 am
Catch the Wave: Using Prior Knowledge of Action Potentials to Identify Neurons in Chronic Recordings
Shruti Vempati¹, Adam Snyder¹,², and Matthew Smith¹
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

9:12 am
Transcriptional and Metabolic Characterization of Antimalarial Resistant and Sensitive Malaria Parasites
Ana Untaroiu¹, Maureen Carey¹, Jason Papin¹, Jennifer Guler¹
¹University of Virginia, Charlottesville VA

9:21 am
Understanding Cardiac Macrophage Polarization After Myocardial Infarction Through a Signaling Model
Jingyuan Zhang¹, Angela Zeigler¹, Kristine DeLeon-Pennell², Merry Lindsey²,³, and Jeffrey Saucerman¹
¹University of Virginia, Charlottesville, VA, ²University of Mississippi Medical Center, Jackson, MS, ³G.V. (Sonny) Montgomery Veterans Affairs Medical Center, Jackson, MS

MEET THE EXPERT

8:00 am–9:30 am Room 204
Meet the Experts on Data-Sharing
Organized by Dr Pep Pàmies, Chief Editor, Nature Biomedical Engineering

Scientific research flourishes when data are preserved and made accessible. The Human Genome Project has become one prominent example of how making data broadly available prior to publication can be profoundly valuable to scientists, industry and the public. Panelists will discuss current bottlenecks to, and ways to promote, a culture of data sharing in biomedical engineering. The session will feature 10-min presentations from each of the panel members and a round-table discussion.

Panel Members:

- **Prof Kevin Peterson**, Department of Family Medicine and Community Health, University of Minnesota
- **Dr Andrew A. Quong**, Director, Partnership Development Office, Frederick National Laboratory for Cancer Research and Leidos Biomedical Research, Inc.
- **Dr Michelle A. Berny-Lang**, Program Director, Center for Strategic Scientific Initiatives, National Cancer Institute, National Institutes of Health
- **Connie Lee**, Big Data Scientist Training Enhancement Program (BD-STEP) Director, Veterans Health Administration
**Saturday, October 8 | 1:30 pm–3:00 pm | Platform Session 2**

**OP-Sat-2-1**
**Auditorium 1**

**Track: Cellular and Molecular Bioengineering**

**Mechanobiology of Cell Adhesion II**

*Chairs: Amit Pathak, Aaron Baker*

**1:30 pm**
*Mechanosensitivity of Integrins and Adhesions are Modulated by Lipid Order*
Seoyoung Son¹, George Moroney¹, and Peter Butler¹
¹The Pennsylvania State University, State College, PA

**1:45 pm**
*Conformational Switch, Activation and Clustering in Transmembrane Signaling and Mechanotransduction*
Mohammad Mofrad¹
¹UC Berkeley, Berkeley, CA

**2:00 pm**
*Optical Trapping to Determine Mechanical Forces in Living Zebrafish*
Jack Staunton¹, Ben Blehm¹, Alexus Devine¹, and Kandice Tanner¹
¹National Cancer Institute (NIH), Bethesda, MD

**2:15 pm**
*Nanotopography-Induced Structural Anisotropy and Sarcomere Development in Human Cardiomyocytes Derived from Induced Pluripotent Stem Cells*
Daniel Carson¹, Marketa Hnilova¹, Xiulan Yang¹, Cameron Nemeth¹, Jonathan Tsui¹, Alec Smith¹, Alex Jiao¹, Michael Regnier¹, Charles Murry¹, Candan Tamerler², and Deok-Ho Kim¹
¹University of Washington, Seattle, WA
²University of Kansas, Lawrence, KS

**2:30 pm**
*Novel Role of Cadherin 11 in Extracellular Matrix Synthesis and Muscular Physiology*
Yayu Liu¹, Seldeen Kenneth¹,², Sindhu Row¹, Troen Bruce¹,², Sandeep Agarwal¹, and Andreas Stelios¹
¹University at Buffalo, Buffalo, NY
²Veterans Affairs Western New York Healthcare System, Buffalo, NY

**2:45 pm**
*Force Activated Protein Dynamics in Focal Adhesion Stability*
Katheryn Rothenberg¹ and Brenton Hoffman¹
¹Duke University, Durham, NC

**OP-Sat-2-2**
**Auditorium 2**

**Track: Cancer Technologies**

**Engineered Models of Cancer Metastasis and Treatment Response**

*Chairs: Thomas Zangle, Pamela Kreeger*

**1:30 pm**
*Targeting Flow-induced Heterogeneity in Ovarian Cancer with Engineered 3D Models*
Imran Rizvi¹, Huang-Chiao Huang¹, Yuijiro Tsujita¹, Siram Anbil¹,²,³, William Hanna², Jonathan Celli², Utkan Demirci², and Tayyaba Hasan¹
¹Massachusetts General Hospital, Harvard Medical School, Boston, MA
²Howard Hughes Medical Institute, Chevy Chase, MD
³University of Texas Health Science Center at San Antonio, San Antonio, TX

**1:45 pm**
*3D Micro-scale Model of Cortical Inclusion Cysts in Early Ovarian Cancer*
Andrew Fleszar¹, Peyton Uhl¹, and Pamela Kreeger¹
¹University of Wisconsin-Madison, Madison, WI

**2:00 pm**
*A 3D Bioprinting Biomimetic Cell-laden Bone Matrix for Breast Cancer Metastasis Study*
Xuan Zhou¹, Wei Zhu¹, Benjamin Holmes¹, Shida Miao¹, Haitao Cui¹, and Lijie Zhang¹
¹The George Washington University, Washington, DC

**2:15 pm**
*The Role of the Blood Microenvironment in Cancer Metastasis*
Joanna Sylman¹, Annachiara Mitrugno¹, Sandra Baker-Groberg¹, Garth Tormoen¹, Rosalie Sears¹, Xiaolin Nan¹, Travis Walker², Paul Newton², Peter Kuhn³, Pallavi Dhagat², and Owen McCarty¹
¹Oregon Health Science University, Portland, OR
²Oregon State University, Corvallis, OR
³University of Southern California, Los Angeles, CA

**2:30 pm**
*Pro-Survival Integrin Signaling and Tissue Stiffness in Engineered Tumor Microenvironment Regulate B Cell Receptor Activity in Aggressive Human B Cell Lymphomas*
FNU Apoorva¹, Ye Tian¹, Leandro Cerchietti², Ari Melnick², and Ankur Singh¹
¹Cornell University, Ithaca, NY
²Weill Cornell Medical College, New York, NY

**2:45 pm**
*A 3D Acoustofluidic Tumor Model for Localized Drug Release and Response to Chemotherapy*
Ioannis Zervantonakis¹ and Costas Arvanitis²
¹Harvard Medical School, Boston, MA
²Brighwam and Women’s Hospital, Boston, MA
Saturday, October 8 | 1:30 pm–3:00 pm | Platform Session 2

**OP-Sat-2-3**  
**Auditorium 3**

**Track: Biomechanics**

**Advances in Biomechanical Testing of Medical Devices**

*Chairs: Ruth Ochia, Muralidhar Padala*

1:30 pm  
**Mechanical Surrogates of Brain Tissue**  
Daniel Stewart¹, Andrés Rubiano², and Chelsey Simmons¹  
¹University of Florida, Gainesville, FL

1:45 pm  
**Biomechanical Effects of Strap Tension on the Corrective Force Capacity of a Scoliosis Brace**  
Chloe Chung¹, Derek Kelly², Jack Steele³, Terrell Tate³, Cody Bateman¹, and Denis DiAngelo¹  
¹UTHSC, Memphis, TN, ²Campbell Clinic Orthopaedics and Le Bonheur Children’s Hospital, Collierville, TN, ³The Center for Orthotics and Prosthetics, Inc., Memphis, TN

2:00 pm  
**Feasibility of Inertial Measurement Units for Biomechanical Testing and Ergonomic Evaluation of Neck Posture During Surgical Instrument Operation**  
Bethany Lowndes¹, Melissa Morrow¹, Emma Fortune¹, and Susan Hallbec¹  
¹Mayo Clinic, Rochester, MN

2:15 pm  
**Modeling and Simulating Fatigue in Bioprosthetic Heart Valves: Permanent Set as a First Step**  
Will Zhang¹ and Michael Sacks¹  
¹The University of Texas at Austin, Austin, TX

**Sat-2-4**  
**Room 102AB**

**Track: Biomaterials**

**Dynamic Biomaterials**

*Chairs: Yan Li, Rebecca Willits*

1:30 pm  
**Biodegradable and Conductive Polyurethane Elastomers**  
Xinzhu Gu¹, Zhongwei Mao¹², Souvik Roy¹, and William Wagner¹  
¹University of Pittsburgh, Pittsburgh, PA, ²Tsinghua University, Beijing, China, People’s Republic of

1:45 pm  
**Integrating Chemical and Optical Responsive Cells and Flexible Materials for a Biosensing Soft Robot**  
Kyle Justus¹, Daniel Lewis², Carmel Majidi¹, Philip LeDuc¹, and Cheemeng Tan²  
¹Carnegie Mellon University, Pittsburgh, PA, ²University of California, Davis, Davis, CA

2:00 pm  
**Development of a Combinatorial Hydrogel Platform for Screening 3D Cell-Biomaterial Interactions**  
Sebastian Vega¹, Kwang Hoon Song¹, and Jason Burdick¹  
¹University of Pennsylvania, Philadelphia, PA

2:15 pm  
**Rapid, Visible-light Triggered Degradation of Hydrogels Crosslinked by Photoactive Ruthenium Complex**  
Christopher Highley¹, Teresa Rapp¹, Ivan Dmochowski¹, and Jason Burdick¹  
¹University of Pennsylvania, Philadelphia, PA

2:30 pm  
**Spatiotemporal Control of Cardiac Anisotropy Using Dynamic Nanotopographic Cues**  
Paulos Mengsteab¹, Koichiro Uto¹, Alec Smith¹, Sam Frankel¹, Elliot Fisher¹, Zeid Nawas¹, Jesse Macadangdang¹, Mitsuhiro Ebara², and Deok-Ho Kim¹  
¹University of Washington, Seattle, WA, ²National Institute for Materials Science, Tsukuba, Japan

2:45 pm  
**Shape Change in Water-responsive Liquid Crystal Elastomer Bilayers**  
Jennifer Boothby¹, Angela Moncy¹, and Taylor Ware¹  
¹The University of Texas at Dallas, Richardson, TX

*Biomaterials Track sponsored by [ACS Biomaterials](http://www.acsbio.org)*

**OP-Sat-2-5**  
**Room 102C**

**Tracks: Biomedical Imaging and Optics, Cardiovascular Engineering**

**Imaging in Cardiovascular Systems I**

*Chairs: Joan Greve, Craig Goergen*

1:30 pm  
**New Generation CMOS Panoramic Imaging System for Cardiac Electrophysiology**  
Christopher Gloschat¹, Matthew Kay¹, and Igor Efimov¹  
¹The George Washington University, Washington, DC

1:45 pm  
**Development of a High Frame Rate Ultrasound Tissue Doppler Imaging Method to Assess Intrinsic Wave Propagation through the Myocardium**  
Aaron Engel¹ and Greg Bashford¹  
¹University of Nebraska, Lincoln, NE

2:00 pm  
**Multiphoton Microscopy Platform Enables Visualization of In Vivo Cellular Dynamics within the Beating Mouse Heart**  
Jason Jones¹, David Small¹, and Nozomi Nishimura¹  
¹Cornell University, Ithaca, NY

2:15 pm  
**Noise Amplitude and Reduced Leads Increase Uncertainty in Electrocardiographic Imaging**  
Jessie France¹ and Chris Johnson¹  
¹Scientific Computing and Imaging Institute, University of Utah, Salt Lake City, UT
2:30 pm
Real-time MRI Motion Tracking of the Cardiac Cycle in Breath-Held, Normal and Heavy Breathing
F. Scott Gayzik¹, Craig Hamilton¹, and Ashley Weaver¹
¹Wake Forest University School of Medicine, Winston-Salem, NC

2:45 pm
Investigating Mechanisms and Prevention of Alcohol-induced Congenital Heart Defects using OCT Imaging
Andrew Rollins¹, Pei Ma¹, Shi Gu¹, Ganga Karunamuni¹, Lindsy Peterson¹, Megan Sheehan¹, Cameron Pedersen¹, Michael Jenkins¹, and Michiko Watanabe¹
¹Case Western Reserve University, Cleveland, OH

OP-Sat-2-7 Room 101B
Track: Cardiovascular Engineering
Computational Modeling in Cardiovascular Systems II

Chairs: Amanda Randles, Wei Sun

1:30 pm
Investigation of Pericyte Dynamics using In Vivo Imaging and Computational Modeling—INVITED
Shayn Peirce¹
¹University of Virginia, Charlottesville, VA

2:00 pm
SimVascular: An Open Source Pipeline for Image-Based Cardiovascular Simulation
Hongzhi Lan¹, Adam Updegrove², Nathan Wilson³, Shawn Shadden⁴, and Alison Marsden¹
¹Stanford University, Stanford, CA, ²University of California–Berkeley, Berkeley, CA, ³Open Source Medical Software Corporation, Santa Monica, CA

2:15 pm
Numerical Simulation of Coronary Artery Motion and Blood Flow Using a Fluid Structure Interaction Model
Daphne Meza¹, David A. Rubenstein¹, and Wei Yin¹
¹Stony Brook University, Stony Brook, NY

2:30 pm
Inward Rectifying Potassium Channels and Spreading Vasodilation in the Cerebral Vasculature
Arash Moshkforoush¹ and Nikolaos Tsoukias¹
¹Florida international University, Miami, FL

2:45 pm
Anatomically-Driven Multiscale Model of Ascending Thoracic Aorta, with Application to Multidirectional Experiments
Rohit Dhume¹, Christopher Korenczuk¹, and Victor Barocas¹
¹University of Minnesota, Minneapolis, MN

SOP-Sat-2-8 Room 101C
Track: Tissue Engineering
Stem Cells in Tissue Engineering

Chairs: Kristopher Kilian, Kelly Stevens

1:30 pm
Bioinspired Materials Systems to Study and Regulate Stem Cell Biology—INVITED
Kevin Healy¹
¹University of California, Berkeley, Berkeley, CA

2:00 pm
Biomimetic Self-assembled Scaffolds Enhance Muscle Stem Cell Transplantation
Benjamin Cosgrove¹,², Eduard Sleep¹, Mark McClendon¹, Adam Preslar¹, Russell Haynes², Thomas Meade¹, Samuel Stupp³, and Helen Blau¹
¹Cornell University, Ithaca, NY, ²Stanford University, Stanford, CA, ³Northwestern University, Chicago, IL

2:15 pm
Breast Cancer Cell-derived Factors Promote Osteogenic Differentiation of Mesenchymal Stem Cells
Aaron Chio¹, Maureen Lynch², and Claudia Fischbach¹
¹Cornell University, Ithaca, NY, ²University of Massachusetts Amherst, Amherst, MA

2:30 pm
Generation of Functional Skeletal Muscle Tissues from Human Pluripotent Stem Cells (hPSCs)
Lingjun Rao¹ and Nenad Bursac²
¹Duke University, Durham, NC

2:45 pm
Salivary Gland Engineering via the Combination of Human Stem/Progenitor Cells and Synthetic Matrices
Padma Pradeepa Srinivasan¹, Tugba Ozdemir¹, Eric Fowler¹, Shuang Liu¹, Daniel Harrington², Robert Witt³,⁴, Mary C. Farach-Carson¹,², Xinqiao Jia¹, and Swati Pradhan-Bhatt¹,⁴
¹University of Delaware, Newark, DE, ²Rice University, Houston, TX, ³Thomas Jefferson University, Philadelphia, PA, ⁴Helen F. Graham Cancer Center & Research Institute, Newark, DE

OP-Sat-2-9 Room 101D
Track: Device Technologies and Biomedical Robotics
Medical Device Development and Computational Models

Chairs: Ramesh Raghupathy, Ferris Pfeiffer

1:30 pm
Beat-by-beat Control of the Heart: Prevention and Control of Cardiac Alternans
Kanchan Kulkarni¹, Christopher Johnson¹, and Elena Tolkacheva¹
¹University of Minnesota, Minneapolis, MN
1:45 pm
Optimized Programming Algorithm for Cylindrical and Directionally Segmented Deep Brain Stimulation Electrodes
Daria Nesterovich Anderson1, Braxton Osting1, Alan “Chuck” Dorval1, and Christopher Butson1
1University of Utah, Salt Lake City, UT

2:00 pm
Effects of Unilateral Exoskeleton Propulsive Assistance on Cost of Transport
Tracy Giest1, Richard Nuckols1, and Greg Sawicki1
1North Carolina State University, Raleigh, NC

2:15 pm
Integration of Music, Thermal, and Mechanical Stimulation for Management of Alzheimer’s Disease
Xinghua Jia1, Dong Wang1, Kathryn Kaltenmark1, Byron Carper1, Douglas Scharre2, Scott Galster3, and Minjiun Zhang1
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Department of Neurology, Division of Cognitive Neurology, The Ohio State University Wexner Medical Center, Columbus, OH, 3711th Human Performance Wing, Air Force Research Laboratory, WPAFB, OH

2:30 pm
Development of a Novel Device for Tube Thoracostomy in Trauma Patients
Shannen Kizilski1,2, Xiang Zhang2, Nigel Kojimoto2, Kristi Oki1, Sheng Jiang2, Tyler Wortman2, and Nevan Hanumara1
1University of Minnesota, Minneapolis, MN, 2Massachusetts Institute of Technology, Cambridge, MA

2:45 pm
Handheld Microfluidic Immunoassay System for Point-of-Care Diagnostics
Baichen Li1 and Zhenyu Li1
1The George Washington University, Washington, DC

2:00 pm
Cell-Cell Communication in PEG Hydrogel Microenvironment for Improved Beta Cell Function
Seda Kizilel1, Tugba Ball1, and Erdal Karaoz2
1Koc University, Istanbul, Turkey, 2Liv Hospital, Istanbul, Turkey

2:15 pm
Fabricating Anti-Fas Conjugated Hyaluronic Acid Microsphere Gels for Neural Stem Cell Transplantation
Dalia Shendi1, Dirk Albrecht1, and Anjana Jain2
1Worcester Polytechnic Institute, Worcester, MA

2:30 pm
Ultra-Strong, Thermoresponsive Double Network Membranes for Implanted Glucose Biosensors
Anna Kristen Means1, Ruochong Fei1, Alexander Abraham1, Andrea Locke1, Gerard Cote1, and Melissa Grunlan1
1Texas A&M University, College Station, TX

2:45 pm
Fiber Textile Technology for Musculoskeletal Tissue Engineering Applications
Iman Yazdi1, Afsoon Fallahi1, Raquel Costa-Almeida1, Huseyin Avci1, Ali Tamayo1, and Ali Khademhosseini1
1Brigham and Women’s Hospital, Cambridge, MA

* Biomaterials Track sponsored by

ACS Biomaterials

OP-Sat-2-11 Room 200E
Track: Nano and Micro Technologies
Advances in Pathogen Detection

Chair: Jacqueline Linnes, Xuanhong Cheng

1:30 pm
A New Approach to Rapid Pathogen Isolation using Molecular Buoys
Shannon Weigum1, Lichen Xiang1, Erica Osta1, Linying Li2, and Gabriel Lopez1,2
1Texas State University, San Marcos, TX, 2Duke University, Durham, NC

1:45 pm
RNA Extraction from a Mycobacterium under Ultrahigh Electric Field Intensity in a Microfluidic Device
Sai Ma1, Bryan Bryson2, Chen Sun1, Sarah Fortune2, and Chang Lu1
1Virginia Tech, Blacksburg, VA, 2Harvard School of Public Health, Boston, MA

2:00 pm
Single-Step Paper Diagnostic that Improves the Limit of Detection of Chlamydia through Thermodynamic Target Concentration
Garrett Mosley1, Yue Han1, Benjamin Wu1, and Daniel Kamei2
1University of California Los Angeles, Los Angeles, CA
Saturday, October 8 | 1:30 pm–3:00 pm | Platform Session 2

**2:15 pm**
Vertical Gold Nanorod Array Based DNA Sensing with Improved Performance  
Zhong Mei¹ and Liang Tang¹  
¹University of Texas at San Antonio, San Antonio, TX

**2:30 pm**
Diagnostic Chewing Gums Targeting the Tongue as 24/7 Available Detector  
Jennifer Ritzer¹, Tessa Lühmann², Claudia Rohde³, Miriam Pein-Hackelbusch⁴, Cecilia Amstalden¹, Caroline Kleider¹, Uwe Schedler⁵, Thomas Thiele⁶, Ralf Wyrwa⁵, Matthias Schnabelrauch⁷, and Lorenz Meinel¹  
¹University of Würzburg, Würzburg, Germany, ²University of Würzburg, Würzburg, Ghana, ³Innovent, Jena, Germany, ⁴University of Düsseldorf, Düsseldorf, Germany, ⁵PolyAn GmbH, Berlin, Germany

**2:45 pm**
In Vivo Monitoring of Branched Chain Amino Acid Dynamics Using Online Microdialysis-Capillary Electrophoresis  
Megan Weisenberger¹ and Michael T. Bowser¹  
¹University of Minnesota, Minneapolis, MN

**OP–Sat–2–13 Room 200D**
Track: Biomedical Imaging & Optics

**MRI I**

**1:30 pm**
Imaging and Targeting Efficacy of Nanoparticles for Atherosclerosis with Varying Gadolinium Chelators  
Sang Pil Yoo¹, Matthew Tirrell¹, and Eun Ji Chung²  
¹University of Chicago, Chicago, IL, ²University of Southern California, Los Angeles, CA

**1:45 pm**
Metabolic Assessments of a Migraine Model using Relaxation-Enhanced ¹H Spectroscopy at Ultra-High Field  
Nastaren Abad¹,², Jens Rosenberg¹, Dillon Grice¹, Tangi Roussel³, Michael Harrington⁴, and Samuel Grant¹,²  
¹Florida State University, Tallahassee, FL, ²National High Magnetic Field Laboratory, Tallahassee, FL, ³Weizmann Institute of Science, Rehovot, Israel, ⁴Huntington Medical Research Institutes, Pasadena, CA

**2:00 pm**
Rationally Designing the Magnetic Resonance Imaging performance of Theranostic Nanoconstructs  
Miguel Ferreira¹, Aeju Lee¹, Yanfei Hu¹, Anna Palange¹, and Paolo Decuzzi¹  
¹Istituto Italiano di Tecnologia, genova, Italy

**2:15 pm**
Dipole Array Design for MRI at 10.5 Tesla  
Jinfeng Tian¹, Russell Lagore¹, Arcan Erturk¹, Lance Delabarre¹, Yigitcan Eryaman¹, Lynn Utecht¹, Gregory Metzger¹, J. Thomas Vaughan²,³, Kamil Ugurbil¹, and Gregor Adriany¹  
¹University of Minnesota, Minneapolis, MN, ²Columbia University, New York, NY

**2:30 pm**
Genetically Encodable Acoustomagnetic Reporters for Background-Free Molecular and Cellular MRI  
George Lu¹, Arash Farhadi¹, Jerzy Szablowski¹, Samuel Barnes², Anupama Lakshmanan¹, Raymond Bourdeau¹, and Mikhail Shapiro¹  
¹California Institute of Technology, Pasadena, CA, ²Loma Linda University, Loma Linda, CA
2:45 pm
Multiple Overlapping Thin Slice Acquisition (MOTSA) for Applications in Studying Preclinical Models of Cardiovascular Disease
Amos Cao1 and Joan Greve1
1University of Michigan, Ann Arbor, MI

OP-Sat–2–14 Room 200G
Track: Drug Delivery Cancer Drug Delivery I
Chairs: Bingmei Fu, Vivek Gupta

1:30 pm
Theranostic Delivery to Canine Intracranial Gliomas via Convection-Enhanced Delivery
Michael Caplan1, Simon Platt2, Hope Jehng1, Courtenay Freeman1, Alexandros Bournas2, and Costas Hadjipanayis3
1Arizona State University, Tempe, AZ, 2University of Georgia, Athens, GA, 3Mount Sinai Beth Israel, New York, NY

1:45 pm
Multifunctional Unimolecular Micelles Loaded with the Anti-Cancer Drug Amino Flavone for Triple-Negative Breast Cancer Therapy
Guojun Chen1, Ashley Brinkman1, Yidan Wang1, Curtis Hedman1, Thomas Havighurst1, Nathan Sherer1, Wei Xu1, and Shaoqin Gong1
1University of Wisconsin-Madison, Madison, WI

2:00 pm
Bis(indolyl)methane Based Retinoid X Receptor Agonist for Efficient Nanotherapy in Onco-Pigs via In-Silico-to-In Vivo Approach
Santosh Mista1, Mao Ye1, Arun De1, Laurie Rund1, Lawrence Schook1, and Dipanjan Pan1
1University of Illinois at Urbana-Champaign, Urbana, IL

2:15 pm
A Multi-functional Drug Delivery System for the Treatment of Drug-resistant Breast Cancers
Song Lou1, Micah Dezort1, Taylor Lohneis1, Zongmin Zhao1, and Chenming Zhang1
1Virginia Tech, Blacksburg, VA

2:30 pm
Elevated AQP3 Expression Enhances H2O2 Permeability: Implications for Improving Ascorbate Therapy
Dianeira Erudaitius1, Andrew Huang1, Sarah Kazmi1, Garry Buettner2, and Victor Rodgers1
1University of California Riverside, Riverside, CA, 2University of Iowa, Iowa City, IA

2:45 pm
Mechanistic Studies on the Self-Assembly of PLGA Patchy Particles and their Biomedical Applications
Carolina Salvador-Morales1,2, Valeria Márquez-Miranda1, Ingrid Araya-Duran1, Jonathan Canan4, Fernando Gonzalez-Nilo3, Cristian Vilos1, Juan Cebral1, Fernando Mut1, Rainald Lohner1, Brian Leong3, Gobalakrishnan Sundaresan2, and Jamal Zweit1
1George Mason University, Bioengineering Department, Fairfax, VA, 2George Mason University, Krasnow Institute, Fairfax, VA, 3 Universidad Andres Bello, Santiago, Chile, 4Fundación Fraunhofer Chile Research, Santiago, Chile, 5Universidad Andres Bello, Center for Integrative Medicine and Innovative Science, Faculty of Medicine, Santiago, Chile, 6George Mason University, Center for Computational Fluid Dynamics, College of Sciences, Fairfax, VA, 7Virginia Commonwealth University, Richmond, VA
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| 1:30 pm| Investigating Simultaneous microECoG Recordings and In Vivo Vascular Imaging with Concomitant MRI in a Chronic Photothrombotic Stroke Model—INVITED
Kyle Swanson¹, Sarah Brodnick¹, Jared Ness¹, Joseph Novello¹, Aaron Dingle¹, Wendell Lake¹, David Niemann¹, and Justin Williams¹ ¹University of Wisconsin, Madison, WI |
| 1:45 pm| Controlling Plasticity in Sensory Cortical Regions Using Multisensory Neuromodulation
Cory Gloeckner¹, Jio Nocon¹, and Hubert Lim¹ ¹University of Minnesota, Minneapolis, MN |
| 2:00 pm| Quadruple Labelled Mouse to Study Tissue Response to Brain Implanted Devices
Janak Gaire¹, Heui Chang Lee¹,², Seth Currlin¹, and Kevin J. Otto¹ ¹University of Florida, Gainesville, FL, ²Purdue University, West Lafayette, IN |
| 2:15 pm| Evaluation of Novel Amorphous Silicon Carbide Ultramicroelectrodes for Neural Interfacing
Felix Deku¹, Yarden Cohan¹, Ben Pearre², Alexandra Joshi-Imre¹, Atefeh Ghazavi¹, Winthrop Gillis², Timothy Gardner², and Stuart Cogan¹ ¹University of Texas at Dallas, Richardson, TX, ²Boston University, Boston, MA |
| 2:30 pm| Simultaneous Optical and Electrical In Vivo Analysis of the Enteric Nervous System
Nikolai Rahilin¹, Bradley Barth², Jiann Choi¹, Nozomi Nishimura¹, and Xiling Shen² ¹Cornell University, Ithaca, NY, ²Duke University, Durham, NC |
| 2:45 pm| Integrated Electroencephalography & Transcranial Direct Current Stimulation Device
L. Savannah Dewberry¹, Matthew N. Gray¹, and Aaron R. Sears¹ ¹University of Alabama at Birmingham, Birmingham, AL |

**OP-Sat-2-18**  Room 200B

**Track: Undergraduate Research, Design & Leadership**

**Undergraduate Research, Design & Leadership II: Biomaterials and Tissue Engineering**

**Chairs:** Sherry Harbin, Renee Cottle

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| 1:30 pm| Enhancing Chitosan Nanoparticle Delivery to Lung Epithelial Cells
Blake Lash¹, Joscelyn Mejías¹, and Krishnendu Roy¹ ¹Georgia Institute of Technology, Atlanta, GA |
| 1:39 pm| Development of bFGF-Eluting Biodegradable Elastomeric Inks for Three-Dimensionally Printed Tympanic Membrane Perforation Patches
Sabrina Liu¹, Nicole Black¹, Elliott Kozin², Aaron Remensnyder³, and Jennifer Lewis¹ ¹Harvard University, Cambridge, MA, ²Massachusetts Eye and Ear Infirmary, Boston, MA |
1:48 pm
The Role of Mechanical Loading In ECM Bioscaffold Mediated Skeletal Muscle Remodeling
Riddhi Gandhi1, Jenna Dziki1, Ross Giglio1, Brian Sicari1, Derek Wang2, Ricardo Londono1, and Christopher Dearth3
1University of Pittsburgh, Pittsburgh, PA, 2McGowan Institute for Regenerative Medicine, Pittsburgh, PA, 3Walter Reed National Military Medical Center, Bethesda, MD

1:57 pm
TSG-6 Modulation of Neutrophil Migration Patterns in Excisional Skin Wound Repair
Kathryn Hardin1,2, Sajina Shakya1,3, Judith Mack1, and Edward Maytin1
1Cleveland Clinic, Cleveland, OH, 2Boston University, Boston, MA, 3Cleveland State University, Cleveland, OH

2:06 pm
dECM Endothelialization to Create a Non-Thrombogenic Interface of an Engineered Vascular Structure
Hamsini Sriraman1, Christopher Broda2, Eric Chau3, Rachel Van Druren4, Luiz Sampaio3, Andrea Gobin3, and Doris Taylor3
1Rice University, Houston, TX, 2Baylor College of Medicine, Houston, TX, 3Texas Heart Institute, Houston, TX

2:15 pm
The Effect of Environmental Aging on the Material Properties of Soft-Polymer Materials for 3D-Printed Custom Foot Orthotics
Shannon Hall1, Lauren Jackson1, Breanne Przestrzelski1, John DesJardins1, Brian Kalu2, Nikki Hooks2, Walter D. Ballard II1, Timothy Pruett1, and Steven C. George1
1Columbia University, New York, NY, 2University of Missouri, Columbia, MO

2:24 pm
Culture with Trimethylamine N oxide After Transient Chondroitinase ABC-Treatment as a Strategy for Functional Tissue Engineering of Cartilage Derived from Adult Chondrocytes
William Yu1, Andrea Tan1, James Cook3, Gerard Ateshian1, and Clark Hung1
1Columbia University, New York, NY, 2University of Missouri, Columbia, MO

2:33 pm
Continuous Cocaine Administration Results In Significant Trabecular Bone Deterioration
Amna Haider1, Brandon Zhuang1, Hyunsu Shin1, Kevin Clare1, Craig Allen1, Gabriel Pagnotti1, Congwu Du1, Clinton Rubin1, and M. Ete Chan1
1Stony Brook University, Stony Brook, NY

2:42 pm
Novel PEDOT Coating Functionalization Methods for Bio-interfacing Applications
Bingchen Wu1, Bin Cao1, and Xinyan Cui1
1University of Pittsburgh, Pittsburgh, PA

2:51 pm
A Microfluidic Device Based Angiogenesis Assay to Study the Effects of Interstitial Flow
Arnold Tao1, Venktesh S. Shirure1, and Steven C. George1
1Washington University in Saint Louis, St. Louis, MO
3:45 pm
Breast Cancer-Shed Extracellular Vesicles Stimulate Adipose Stem Cell Differentiation into Myofibroblasts By Activating MAPK Signaling
Young Hye Song¹, Sung Jin Choi¹, Christine Warncke¹, Siyoung Choi¹, Marc Antonyak¹, Richard Cerione¹, and Claudia Fischbach¹
¹Cornell University, Ithaca, NY

4:00 pm
Bacterial Quorum-Sensing Signals in the Breast Tumor Microenvironment: Implications on Breast Cancer Survival and Proliferation
Brittany Balhouse¹ and Scott Verbridge¹
¹Virginia Tech, Blacksburg, VA

4:15 pm
3D Hydrogel Micowell Arrays with Encapsulated Adipocytes as a Tumor Microenvironment Model for Studying Breast Cancer
Xiaoshan Yue¹, John Casey¹, Trung Dung Nguyen¹, Victoria Zellmer¹, Siyuan Zhang¹, and Pinar Zorlutuna¹
¹University of Notre Dame, Notre Dame, IN

4:30 pm
Single Cell Tracking of the Epithelial-Mesenchymal Transition in 3D Tumor Organoids
Susan Leggett¹, Thomas Valentin¹, Marielena Gamboa Castro¹, and Ian Wong¹
¹Brown University, Providence, RI

3:15 pm
Non-swelling Microchanneled Hydrogels Reveal that Matrix Degradability Controls Cell Invasion Mode
Brendon Baker¹, Britta Trappmann¹, Jason Burdick², and Christopher Chen¹
¹Boston University, Boston, MA, ²University of Pennsylvania, Philadelphia, PA

3:30 pm
Sprayable Thermoresponsive Polymeric Coatings for Intestinal Tissue Regeneration
Meryem Pehlivaner¹ and Adam Ekenseair¹
¹Northeastern University, Boston, MA

3:45 pm
Precision-engineered Porous Material with Tunable Mechanical Property for Vascular Graft Application
Le Zhen¹ and Buddy Ratner¹
¹University of Washington, Seattle, WA

4:00 pm
A Three-Component Self-Assembling Peptide Hydrogel System to Independently Control Matrix Stiffness and Adhesiveness
Nathaniel Hogrebe¹, Alisha Sarang-Sieminski², James Reinhardt¹, and Keith Gooch¹
¹The Ohio State University, Columbus, OH, ²Olin College, Needham, MA

4:15 pm
Shape Memory Polyurethane Urea for Ureteral Stents
Yang Zhu¹, Zuwei Ma¹, Sang-ho Ye¹, and William Wagner¹,²,³,⁴
¹McGowan Institute for Regenerative Medicine, University of Pittsburgh, Pittsburgh, PA, ²Department of Bioengineering, University of Pittsburgh, Pittsburgh, PA, ³Department of Surgery, University of Pittsburgh, Pittsburgh, PA, ⁴Department of Chemical Engineering, University of Pittsburgh, Pittsburgh, PA

3:15 pm
Transcatheter Tissue-Engineered Venous Valve
Zeeshan Syedain¹, Cole Feagler¹, Thanh Le¹, and Robert Tranquillo¹
¹University of Minnesota, Minneapolis, MN

3:30 pm
Biodegradable Sponge Fabrication for Use In Deep Tissue Negative Pressure Wound Therapy
Harleigh Warner¹,² and William D. Wagner¹,²
¹Wake Forest- Virginia Tech, Winston Salem, NC, ²Wake Forest University School of Medicine, Winston Salem, NC

3:45 pm
Hemocompatibility Evaluation of Nitric Oxide Releasing Dual-lumen Catheters in a Chronic Rabbit Model
Elizabeth Brisbois¹, Maria Kim¹, Azmath Mohammed¹, Terry Major¹, Hitesh Handa², Mark Meyerhoff², and Robert Bartlett¹
¹University of Michigan, Ann Arbor, MI, ²University of Georgia, Athens, GA
4:00 pm  Effect of Capsule Size, Material, and Geometry on the Insulin Release Profile of Encapsulated Islets
Peter Buchwald¹, Alejandro Tamayo-Garcia¹, Alice Tomei¹, and Cherie Stabler²
¹University of Miami, Miami, FL, ²University of Florida, Gainesville, FL

4:15 pm  Extrahepatic Islet Transplantation with A Citrate-based Thermoresponsive Hydrogel
Yunxiao Zhu¹, Xiaomin Zhang², Xunrong Luo ², and Guillermo Ameer¹
¹Northwestern University, Evanston, IL, ²Northwestern University, Chicago, IL

4:30 pm  Biomimetic Microgels with "Switchable" Deformability to Promote Wound Repair
Erin Sproul¹ and Ashley Brown¹
¹North Carolina State University and The University of North Carolina at Chapel Hill, Raleigh, NC

* Biomaterials Track sponsored by

ACS Biomaterials Science & Engineering

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OP-Sat-3-5  Room 102C

Tracks: Biomedical Imaging and Optics, Cardiovascular Engineering

Imaging in Cardiovascular Systems II

Chairs: F. Scott Gayzik, Greg Bashford

3:15 pm  MRI Analysis of Age-Related Changes in the Murine Venous System
Calvin Chiu¹, Olivia Palmer¹, Amos Cao¹, Ulrich Scheven¹, Jose Diaz¹, and Joan Greve³
¹University of Michigan, Ann Arbor, MI

3:30 pm  Investigating Early Development in a Murine Model of Abdominal Aortic Aneurysms
Evon Phillips¹, Ryan Grant¹, and Craig Goergen¹
¹Purdue University, West Lafayette, IN

3:45 pm  Toward Cerebral Blood Flow Velocity Mapping using Synchrotron X-ray Phase Contrast Imaging
Mohammad Izadifar¹,², Michael E. Kelly¹,², and Lissa Peeling¹
¹University of Saskatchewan, Saskatoon, SK, Canada, ²Saskatchewan Cerebrovascular Centre, Saskatoon, SK, Canada

4:00 pm  Determination of Vascular Permeability Without Knowledge of an Arterial Input Function
Joe Tien¹, Xuanyue Li³, Raleigh Linville¹, and Evan Feldman¹
¹Boston University, Boston, MA

4:15 pm  3-Dimensional Light Sheet Fluorescent Imaging and High-Frequency Ultrasonic Transducers to Characterize Doxorubicin-Induced Cardiac Injury and Regeneration
Rene Packard¹, Tyler Beebe¹, Nelson Jen¹, Peng Fei¹, BongJin Kang², Yichen Ding¹, Jianguo Ma², Po-Heng Chen², Jonathan Tang², Hillary Yen¹, Yu-Huan Shih¹, Yonghe Ding², K. Kirk Shung¹, Xiaolei Xu¹, and Tzung Hsiai²
¹UCLA, Los Angeles, CA, ²Huazhong University of Science and Technology, Wuhan, China, People's Republic of, ³USC, Los Angeles, CA, ⁴Mayo Clinic College of Medicine, Rochester, MN

4:30 pm  Analysis of Registration Methods for Motion Artifact Correction in Cardiac Optical Mapping
Marcela Rodriguez¹ and Anders Nygren¹
¹University of Calgary, Calgary, AB, Canada

OP-Sat-3-7  Room 101B

Track: Cardiovascular Engineering

Thrombosis/Hemostasis

Chairs: Anjelica Gonzalez, Danny Bluestein

3:15 pm  Neutrophil-Platelet Aggregation Enabled Vaso-occlusion in Sickle Cell Disease
Maritza Jimenez¹ and Prithu Sundd¹
¹University of Pittsburgh, Pittsburgh, PA

3:30 pm  Flow-Induced Damage to Blood Cells in Aortic Valve Stenosis: A Multiscale Analysis
Koohyar Vahidkhah¹, Dan Cordasco², Mostafa Abbasi¹ Liang Ge³, Elaine Tseng³, Pournijit Bagchi², and Ali Azadani¹
¹University of Denver, Denver, CO, ²Rutgers University, Piscataway, NJ, ³University of California at San Francisco, San Francisco, CA

3:45 pm  The Effect of Factor XI on Clot Structure and Mechanical Strength
Joanna Sylman¹, Xiaolin Nan¹, Jevgenia Rudenko¹, Cristina Puy¹, Erik Tucker², Uranabilg Daalkhajav³, Travis Walker³, Andras Gruber¹,², and Owen McCarty³
¹Oregon Health Science University, Portland, OR, ²Aronora, Inc., Portland, OR, ³Oregon State University, Corvallis, OR

4:00 pm  Synthetic Platelet (SynthoPlate®) Nanotechnology in Prophylactic and Emergent Treatment of Bleeding
DaShawn A. Hickman¹, Christa L. Pawlowski¹, Meenal Shukla², Mitchell Dyer³, Ann Kim¹, Andrew Shevitz¹, Keith R. McCrae², Matthew D. Neal³, Vikram Kashyap¹, and Anirban Sen Gupta¹
¹Case Western Reserve University, Cleveland, OH, ²Cleveland Clinic Foundation, Cleveland, OH, ³University of Pittsburgh Medical Center, Pittsburgh, PA, ⁴University Hospitals Case Medical Center, Cleveland, OH
4:15 pm
Efficacy of Antiplatelet Drugs on Shear-Mediated Platelet Activation in Ventricular Assist Devices
Jawaad Sheriff1, Phat L. Tran2, Lorenzo Valerio3, Marcus Hutchinson2, William Bringle4, Marvin J. Slepian2, and Danny Bluestein1
1Stony Brook University, Stony Brook, NY, ²University of Arizona, Tucson, AZ, ³Politecnico di Milano, Milan, Italy

4:30 pm
In Situ Regeneration of Bioactive Coatings Enabled by an Evolved Staphylococcus aureus Sortase A
Hyun Ok Ham1, Zheng Qu1, Carolyn Haller1, Brent Dorr2, Erbin Dai1, Wookhyun Kim1, David Liu2, and Elliot Chaikof1
1Beth Israel Deaconess Medical Center/ Harvard Medical School, Boston, MA, ²Howard Hughes Medical Institute/ Harvard University, Cambridge, MA

OP–Sat–3–8 Room 101C
Track: Tissue Engineering
Inflammation and Immune-Modulation

Chairs: Rene Olivares-Navarrete, Haipeng Liu

3:15 pm
Dendritic Cell-Targeted Immunomodulation for Tolerance—INVITED
Benjamin Keselowsky1
1University of Florida, Gainesville, FL

3:45 pm
GPNMB Regulates the Crosstalk between Macrophages and MSCs towards Diabetic Wound Repair
Bing Yu1, Talib Alboslemy1, Layla Almutairi1, and Min-Ho Kim1
1Kent State University, Kent, OH

4:00 pm
Understanding the Therapeutic Potential of Human Mesenchymal Stem Cells for Osteoarthritis Treatment
Patricia Diaz-Rodriguez1, Satyavrata Samavedi1, and Mariah Hahn1
1Rensselaer Polytechnic Institute, Troy, NY

4:15 pm
Localizing Pro-Regenerative Inflammation Promotes Skeletal Muscle Repair
Cheryl Lau1, Claire Segar1, and Edward Botchwey1
1Georgia Institute of Technology, Atlanta, GA

4:30 pm
Spatiotemporal Regulation of Inflammation using Engineered Hydrogels
Claire Segar1, Jose Garcia2, Andres Garcia2, and Edward Botchwey1
1Georgia Institute of Technology and Emory University, Atlanta, GA, ²Georgia Institute of Technology, Atlanta, GA

OP–Sat–3–9 Room 101D
Track: Biomedical Engineering Education (BME)

Biomedical Curriculum

Chairs: Brittany Zick, Donald Gaver

3:15 pm
Utilizing Cell Phones, Plasma, and Imaging Software to Introduce Surface Engineering to Freshman
Samuel Bechara1, Jay Goldberg1, Miguel Sotelo1, and Scott Beardsley1
1Marquette University, Milwaukee, WI

3:30 pm
Ten Years of Interdisciplinary Undergraduate Student Research: Outcomes and Lessons Learned
Attiyya Houston1, Carin McBee1, Jabari Knight1, Kendra Oliver1, Jonathan Ehrman1, Stacy Sherrod1, John Wiksw0, and Christina Marasco1
1Vanderbilt University, Nashville, TN

3:45 pm
Systematic Design and HRV Analysis of a Portable ECG System for Biomedical Engineering Education and Curriculum
Mehdi Shokoueinejad1, Samuel Lines1, Fa Wang1, Amit J. Nimunkar1, and John G. Webster1
1UW-Madison, Madison, WI

4:00 pm
Duke-Makerere BME Partnership
William Reichert1, Ashutosh Chilkoti1, Charles Ibengira2, and Robert Ssekitoleko2
1Duke University, Durham, NC, NC, 2Makerere University, Kampala, Uganda

4:15 pm
A Peer-Learning Nursing-Engineering Pedagogy for Senior Design Projects.
Colin Drummond1
1Case Western Reserve University, Cleveland, OH

4:30 pm
Effectiveness of Summer Undergraduate Research Experiences in Biomedical Engineering at Carnegie Mellon University
Conrad Zapanta1 and Keith Cook1
1Carnegie Mellon University, Pittsburgh, PA

OP–Sat–3–10 Room 101E
Track: Biomaterials*

Hydrogel Biomaterials III

Chairs: Jeannine Coburn, Rhima Coleman

3:15 pm
Self-assembly of Hepatic Spheroids Inside Core-shell Poly(ethylene glycol) Microcapsules
Christian Siltanen1, Michaela Diakatou1, Jeremy Lowen1, Armanul Haque1, and Alexander Revzin1
1UC Davis, Davis, CA
3:30 pm
Rupture Force of Cell Adhesion Ligand Tethers Modulates Biological Activities of a Cell-laden Hydrogel
Min Kyung Lee1, Jooyeon Park1, Xuefeng Wang1, Mehdi Roein-Peikar1, Eunkyung Ko1, Ellen Qin1, Jonghwi Lee2, Taekjip Ha1, and Hyunjoon Kong1
1University of Illinois at Urbana-Champaign, Urbana, IL, 2Chung-Ang University, Seoul, Korea, Republic of

3:45 pm
Bioorthogonal Conjugation of Bioactive Proteins to Thiol-Ene Click Microparticles
Faraz Jivan1 and Daniel Alge1
1Texas A&M University, College Station, TX

4:00 pm
Zwitterionic Hydrogels Resist Foreign-body Response in a Stiffness Dependent Manner
Lauren E Jansen1, Luke D Amer2, Thuy V Nguyen1, Raghu Thyagarajan1, Dave Ford1, Stephanie J Bryant2, and Shelly R Peyton1
1University of Massachusetts Amherst, Amherst, MA, 2University of Colorado Boulder, Boulder, CO

4:15 pm
Particle Scaffolds Using Amino Acid Chirality for Spatial Control of Immune Activation in Wounds
Donald Griffin1, Elias Sideris1, Westbrook Weaver1, Philip Scumpia1, Jaekyung Koh1, Dino Di Carlo1, and Tatiana Segura1
1UC Los Angeles, Los Angeles, CA

4:30 pm
Controlling PEG Hydrogel Mechanics through Crosslinking Structure to Promote Microvascularization
Ryan Schweller1, Bruce Klitzman1, and Jennifer West1
1Duke University, Durham, NC

4:45 pm
Magnetic NiFe Electroformed Trap (MagNET): Fabrication Strategy for >100mL/hr Immunomagnetic Sorting
Venkata Yelleswarapu1, Jina Ko1, Anup Singh1, Nishal Shah1, and David Issadore1
1University of Pennsylvania, Philadelphia, PA

5:00 pm
Parallelized Microfluidics for Large-scale Synthesis of Multicomponent Nanoparticles
Michael Toth1 and YongTae Kim1
1Georgia Institute of Technology, Atlanta, GA

Saturday, October 8 | 3:15 pm–4:45 pm | Platform Session 3

3:30 pm
Magnetomotive Displacement of the Tympanic Membrane for Sound Perception
Pin-Chieh Huang1, Eric Chaney1, Ryan Shelton1, and Stephen Boppart1
1University of Illinois at Urbana–Champaign, Urbana, IL

3:45 pm
Dual Energy CT Imaging of the Vascular Effects of Gold Nanoparticles in Radiation Therapy
Jeffrey Ashton1, Jocelyn Hoye1, Katherine Deland1, and David Kirsch1
1Duke University, Durham, NC, 2Duke University Medical Center, Durham, NC

4:00 pm
Fluorescent Nanoplatelets for Cellular Imaging and Delivery: Flat Nanoprobes with Rapid Cellular Entry
Sung Jun Lim1, Minjee Kang1, Daniel R. McDougle1, Mohammed U. Zahid1, and Andrew M. Smith1
1University of Illinois at Urbana-Champaign, Urbana, IL
4:15 pm
RGD Guided Near-infrared Fluorescent Peptide Nanoparticles For Non-invasive Esophageal Cancer Prognosis Imaging
Zhen Fan1,2, Chaochu Cui3,4, Leming Sun1,2, Zui Pan4, and Mingjun Zhang2,5
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH, 3Sun Yat-sen University Cancer Center, State Key Laboratory of Oncology in South China, Collaborative Innovation Center for Cancer Medicine, Guangzhou, China, People's Republic of China, 4Department of Surgery-Thoracic Surgery, The Ohio State University, Columbus, OH, 5Interdisciplinary Biophysics Graduate Program, The Ohio State University, Columbus, OH

4:30 pm
Biocompatible and Photostable Fluorescent Peptide Nanoparticles For In Vivo Imaging
Zhen Fan1,2, Leming Sun1,2, Mark Ruegsegger1, Derek Hansford1, Chaochu Cui1,2, Zui Pan4, Scott Galster5, Peter Mohler6, and Mingjun Zhang1,2
1Department of Biomedical Engineering, College of Engineering, The Ohio State University, Columbus, OH, 2Dorothy M. Davis Heart & Lung Research Institute, The Ohio State University, Columbus, OH, 3Sun Yat-sen University Cancer Center, State Key Laboratory of Oncology in South China, Collaborative Innovation Center for Cancer Medicine, Guangzhou, China, People's Republic of China, 4Department of Surgery-Thoracic Surgery, The Ohio State University, Columbus, OH, 5711th Human Performance Wing, Air Force Research Laboratory, WPAFB, OH, 6Interdisciplinary Biophysics Graduate Program, The Ohio State University, Columbus, OH

4:15 pm
Methods for Whole-brain Probabilistic Tractography in Acute and Chronic Stroke Survivors
Miguel Sotelo1 and Brian Schmit2
1Marquette University, Greenfield, WI, 2Marquette University, Milwaukee, WI

4:30 pm
Significance of Electrode Orientation in Magnetic Resonance Electrical Impedance Tomography (MREIT)
Neeta Ashok Kumar1, Munish Chauhan1, and Rosalind J. Sadleir1
1Arizona State University, Tempe, AZ

OP-Sat-3-13 Room 200D
Track: Biomedical Imaging and Optics
MRI II
Chairs: Miguel Moreira

3:15 pm
Diffusion Altering Reporter Genes for Magnetic Resonance Imaging
Arnab Mukherjee1, Di Wu1, Hunter Davis1, and Mikhail Shapiro1
1California Institute of Technology, Pasadena, CA

3:30 pm
Bio-Orthogonal MRI Imaging-A Novel Method Proposed for Metastatic Cancer Detection
Tanner Ravsten1, William Pitt1, and Neal Bangerter1
1Brigham Young University, Provo, UT

3:45 pm
Preclinical MRI and FDOPA-PET/CT for Monitoring Therapeutic Response in a Syngeneic Mouse Model of Multiple Myeloma
Deep Hatli1, Alexander Bollerman-Nowlis1, Wadha Alyami2, John Engelbach1, Walter Akers1, Joel Garbow1, Jonathan McConathy1, and Monica Shokeen1
1Washington University in St. Louis, St. Louis, MO, 2King Saud University, Riyadh, Saudi Arabia, 3University of Alabama Birmingham, Birmingham, AL

4:00 pm
Magnetic Resonance Glowing Red Blood Cells—INVITED
Santosh Aryal1
1Kansas State University, Manhattan, KS

4:15 pm
Improving Selective Targeting to Macrophage Subpopulations Through Modifying Liposomes with Arginine based Materials
Katie Bratlie1
1Iowa State University, Ames, IA

3:30 pm
The Preparation and Characterization of Long-Circulating Thermosensitive Liposomes for Oxaliplatin
Yan Shen1, Yanan Li2, Linlin Sun1, and Thomas Webster3
1Northeastern University, Boston, MA, 2China Pharmaceutical University, Nanjing, China, People's Republic of China, 3Northeastern University, Boston, Afghanistan

3:45 pm
Efficacy of E-selectin/TRAIL Liposomes to Treat Patient Circulating Tumor Cells in Flowing Whole Blood
Jocelyn Marshall1, Zeinab Mohamed1, Edward Messing2, Deepak Sahasrabudhe2, and Michael King1
1Cornell University, Ithaca, NY, 2University of Rochester, Rochester, NY

4:00 pm
Shear Resistance of Circulating Tumor Cells with Cancer-associated Fibroblasts
Jocelyn Marshall1, Andrea Clinch1, and Michael King1
1Cornell University, Ithaca, NY

4:15 pm
A Unique Enzyme Conjugation Strategy for Enhanced Nanoparticle Tumor Penetration and Highly Efficient Antitumor Efficacy
Hao Zhou1, Zhiyuan Fan1, Junjie Deng1, Pelin Lemos1, Dimitrios Arhontoulis1, Wilbur Bowne1, and Hao Cheng1
1Drexel University, Philadelphia, PA
4:30 pm  
Bioresponsive Polymer Coating on Targeted Drug Nanorods  
Sutapa Barua  
1Missouri University of Science and Technology, Rolla, MO

OP-Sat-3-15  Room 200C
Track: Drug Delivery  
Targeted or Responsive Delivery Systems II  
Chairs: Craig Duvall, Michael Lawrence

3:15 pm  
Translational Nanomaterials for Efficient Targeting of Adipose Tissue Macrophages in Obesity  
Liang Ma1, Tzu-wen Liu1, Kelly Swanson1, and Andrew Smith1  
1University of Illinois at Urbana-Champaign, Urbana, IL

3:30 pm  
A Nitro-furan Antibiotic Turns Oncolytic to Selectively Reduce Breast Cancer Stem Cell and Tumor Growth via STAT-3 Modulation  
Santosh Misra1, Zhe Wu1, Mao Ye1, Klaus Schulten1, and Dipanjan Pan1  
1University of Illinois at Urbana-Champaign, Urbana, IL

3:45 pm  
Reversal of Arterial Calcification in A Rat Model Of Chronic Kidney Disease By Targeted Chelation Therapy With EDTA Loaded BSA Nanoparticles  
Saketh Karamched1, Nasim Nosoudi1, Hannah Moreland1, and Narendra Vyawahare1  
1Clemson University, Clemson, SC

4:00 pm  
Recovering Antibiotic Utility with Silica-Lipid Nanoparticle Composites  
Brandon Slaughter1, Christopher Lino1, Amber McBride1, Patrick Fleig1, Marissa Conroy1, Claire Melo1, Terry Wu2, Natalie Adolph2, Scott Reed1, Carol Ashley1, Jeff Brinker1,2, Eric Carnes1, and Carlee Ashley1  
1Sandia National Laboratories, Albuquerque, NM, 2The University of New Mexico, Albuquerque, NM

4:15 pm  
In Vivo Characterization of Wall Shear Stress Environment in Fetus Umbilical Arteries and Veins  
Shier Nee Saw1, Dawn Chia2, Citra Nurfarah Zaini Mattar2, Arijit Biswas2, and Choon Hwai Yap1  
1National University of Singapore, Singapore, Singapore, 2National University of Health Sciences, Singapore, Singapore

4:30 pm  
Perivascular Flow of Cerebrospinal Fluid in The Brain  
Vino Suresh1 and James Grotberg2  
1University of Auckland, Auckland, New Zealand, 2University of Michigan, Ann Arbor, MI

3:45 pm  
Effect of the Perilymph Hydrodynamic Behavior on the Traveling Wave Motion of the Basilar Membrane in the Cochlea  
A. De Paolis1, M. Bikson1, J.T. Nelson2, M. Packer2, and L. Cardoso1  
1The City College of New York, Department of Biomedical Engineering, New York, NY, 2Department of Defense, Hearing Center of Excellence, Lackland, AFB, TX

4:00 pm  
Using In-Vivo 4D PC-MRI to Obtain Boundary Conditions for CFD Simulations of Flow in Cerebral Aneurysms  
Alireza Vali1, Benjamin Dickerhoff2, Farshid Faraji3, David Saloner3, and Vitaliy Rayz4  
1Medical College of Wisconsin, Milwaukee, WI, 2Marquette University, Milwaukee, WI, 3University of California at San Francisco, San Francisco, CA, 4University of Wisconsin-Milwaukee, Milwaukee, WI

4:15 pm  
Simulations and Experiments of Airflow in Models of Damaged Human Trachea for Surgical Planning  
Grant Armstrong1  
1University of Central Oklahoma, Edmond, OK

OP-Sat-3-17  Room 200I
Track: Neural Engineering  
Neural Invasive Devices/Interfaces: Compatibility, Stimulation, Recording and Modeling  
Chairs: Teresa Murray, Matthew Johnson

3:15 pm  
Close-Packed Microelectrodes for Awake Headfixed 1020-Channel Neural Recording  
Jorg Scholvin1, Brian Allen1, Jacob Bernstein1, Chris Chronopoulos2, Justin Kinney1, Charlie Lamantia2, Caroline Moore-Kochlacs1, Nancy Kopell3, Clifton Fonstad1, and Edward Boyden1  
1Massachusetts Institute of Technology, Cambridge, MA, 2LeafLabs, Cambridge, MA, 3Boston University, Boston, MA

3:30 pm  
Electrocorticographic Features of Therapeutic Deep Brain Stimulation in Tourette Syndrome  
Jonathan Shute1, Enrico Opri1, Rene Molina1, Justin Rossi1, Kelly Foo-te1, Michael Okun3, and Aysegul Gunduz1  
1University of Florida, Gainesville, FL
OP-Sat-3-18  Room 200B

Track: Undergraduate Research, Design & Leadership

Undergraduate Research, Design & Leadership III: Nano/Micro Technology and Bioimaging

Chairs: Delphine Dean, Fang Huang

3:15 pm  
Point-of-Care Microfluidic Biochip to Quantify Inflammatory Response by Measuring IL6 from Whole Blood

Michael Rappleyev, Jackson Winterv, Manish Patellv, Paula Duerte Guevarav, Emilee Flaugherv, Umer Hassanv, Bobby Reddyl, and Tor Jensenv

1University of Illinois at Urbana-Champaign, Champaign, IL, 2Carle Foundation Hospital, Urbana, IL

3:24 pm  
Quantitative Bacterial Chemotaxis Study In Membrane-Enabled Static Gradient Device

Kathleen O’Brien, David Quan, Gary W. Rubloff, Herman O. Sintim, William E. Bentley, and Xiaolong Luo

1The Catholic University of America, Washington, DC, 2University of Maryland, College Park, MD, 3Purdue University, West Lafayette, IN

3:33 pm  
Development of the Fabrication Process and Design of 3D-Folding Shrinky Dinks

Christian Danielson and Kidong Park

1Louisiana State University, Baton Rouge, LA

3:42 pm  
Evaluation of Adipose-derived Mesenchymal Stem Cell Therapy on Neovascularization in Diabetic Mice

Hannah Bouvin, Jamila Hedhli, Iwona Dobrucca, and Lawrence W. Dobrucki

1University of Illinois at Urbana-Champaign, Champaign, IL, 2Iowa State University, Ames, IA

3:51 pm  
Comparative Deformability and Microfluidic Perfusion of Human and Nonhuman Red Blood Cells

Pranav Murugan, Kian Torabian, Nathaniel Piety, and Sergey Shevkoplyas

1University of Houston, Houston, TX

4:00 pm  
Modeling The Human Bone Marrow Perivascular Niche In A Microfluidic Chip

Vittorio Orlandi, Yang Xiao, and Rong Fan

Yale University, New Haven, CT

4:09 pm  
In Vitro Cardiac Organoid Induction: Advancing a 3D “Organ in a Dish” Model for Biomechanical Studies of Early Cardiac Development

Micah Feeney

1University of Pittsburgh, Pittsburgh, PA

4:18 pm  
Intravascular Ultrasound Comparison of 3D Printed Versus In Vivo Superficial Femoral Artery

Hannah Cebull, W. Michael Park, and Paul Bishop

1University of Akron, Akron, OH, 2Cleveland Clinic, Cleveland, OH

4:27 pm  
Automated Analysis of Cell Migration and Nuclear Envelope Rupture in Confluent Environments

Joshua Elacqua, Alexandra McGregor, and Jan Lammerding

Cornell University, Ithaca, NY

4:36 pm  
A Novel Algorithm to Automate Segmentation and Analysis of Trabecular Bone in Rodents

Gregory Dadourian, Ronald Wood, and Hani Awad

1University of Rochester, Bryn Mawr, PA, 2University of Rochester, Rochester, NY
Bioinformatics, Computational and Systems Biology—Undergraduate

Sat–41
Graphical GAIN: User-Friendly Automated Neural Cell Image Processor
Hanyang Li¹, Byron Long¹, Tien Tang¹, Nicholas Grandell²,³, Kylie Balotin¹, Arun Mahadevan¹, and Aminna Gytub¹
¹Rice University, Houston, TX, ²Stanford University, Stanford, CA

Sat–42
Using Machine Learning Models to Identify Disease-Causing Single Nucleotide Variants
Andrianna Ayiotis¹, Zhuo Liu², and Rui Jiang³
¹University of Southern California, Los Angeles, CA, ²Tsinghua University, Beijing, China, People's Republic of

Sat–43
The Protein Data Bank Japan (PDBj): Uncovering Hidden Trends in Macromolecular Structure Data
Michelle Ragsac¹, Akira Kinjo², and Haruki Nakamura³
¹University of California, San Diego, La Jolla, CA, ²Osaka University, Suita, Osaka, Japan

Sat–44
Correlation Revealed in Simultaneously Recorded Multichannel EGG and Antro-Duodenal Manometry
Alex Beltran¹, Armen Gharibians¹, Hayat Moussa¹, and Todd Coleman¹
¹University of California, San Diego, La Jolla, CA

Sat–45
Stochastic Parameterization of the Proliferation-Diffusion Model of Brain Cancer in Mice
Barrett Anderies¹, Eric Kostelich¹, Erica Rutter¹, Tracy Stepien², and David Frakes³
¹Arizona State University, Tempe, AZ, ²University of Arizona, Tucson, AZ

Sat–46
A New Assay for Profiling Endogenous Phosphatase Activity
Megan Burton¹, Lindsey Szmyczak¹, Maria Cabezas¹, and Milan Mrksich¹
¹Northwestern University, Evanston, IL

Sat–47
Inference of a Cardiac Differentiation Network From Mass Cytometry
Catherine Weathered¹, Laura Woo¹, Eli Zunder¹, and Jeffrey Saucerman¹
¹University of Virginia, Charlottesville, VA

Sat–48
A Deep Network for Predicting the Epoxidation of Drug-like Molecules Generalizes to an External Test Set
Ayush Kumar¹
¹Washington University in St Louis, St. Louis, MO

Sat–49
High Oxidant Concentration as an Agent of Cell Death
Priyank Madria¹, Hailee Scelsi¹, and Cassie Mitchell¹
¹Georgia Institute of Technology, Atlanta, GA

Sat–50
Creating a 3-D Hydrogel Model of the Human Endometrium and its Interactions with Immunological Factors
Deborah Plana¹, Abby Hill¹, Christi Cook¹, Linda Griffith¹, and Douglas Laufenburger¹
¹Massachusetts Institute of Technology, Cambridge, MA

Sat–51
Discovery of IncRNA-Encoded Peptidome in Mouse Kidney Inner Medulla
Cameron Flower¹, Chin-Rang Yang¹, and Mark Knepper²
¹University of Connecticut, Burlington, CT, ²National Institutes of Health, Bethesda, MD

Sat–52
Molecular Dynamics Simulation of Nanoscale Membrane Organization to Examine Influenza Virus Binding
Cara Broschkevitch¹ and Peter Kassen¹
¹University of Virginia, Charlottesville, VA

Sat–53
Understanding the Structure and Energetics of Phosphate-Protein Recognition
Sydney Hutton¹, Rui Qi², and Pengyu Ren²
¹Stanford University, Austin, TX, ²The University of Texas at Austin, Austin, TX

Sat–54
Detection of Pancreatic Ductal Adenocarcinoma by Evaluating the Biophysical Properties of Extracellular Vesicles in Human Peripheral Blood Using Particle-Tracking Analysis
Zilu Tang¹, Francis San Lucas¹, Gabrielle Davis¹, Dong Kim¹, Jonathan Castilllo¹, Peter Gascoyne¹,³, Donghui Li¹, Hector Alvarez¹, and Anirban Maitra¹
¹The University of Texas MD Anderson Cancer Center, Houston, TX, ²Rice University, Houston, TX, ³ContinuumDx, Inc, Austin, TX

Sat–55
Design of Multianalyte Biosensor Hardware
Rafael Viana¹, John Aggas², Ankita Bhat³, and Anthony Giuseppi-Elie³
¹Texas A&M, college station, TX, ²Texas A&M, College Station, TX, ³Texas A&M, College station, TX

Sat–56
Automated Cardiomyocyte Segmentation to Identify Novel Regulators of Hypertrophy
Matthew Van de Graaf¹, Philip Tan¹, Jop van Berlo², and Jeffrey Saucerman¹
¹University of Virginia, Charlottesville, VA, ²University of Minnesota, Minneapolis, MN

Sat–57
Classification of Rett Syndrome Behavior Using Machine Learning
Laryssa Gavala¹, F. Quentin Hickam², Sarah Mbikè¹, Jared Wells¹, Neelasaranya Avudaiappan¹, and Brian C. Dean³
¹Bucknell University, Lewisburg, PA, ²Appalachian State University, Boone, NC, ³Clemson University, Clemson, SC

Sat–58
Quantification of Angiogenic Receptor Levels and Heterogeneity on Co-cultured HUVECs and HDFs
Kareem Al-Qadi¹, Princess Imoukhuede¹, Madison Mathias¹, Ji Chen¹, and Sydney Hutton¹, Rui Qi², and Pengyu Ren²
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX, ³The University of Texas MD Anderson, Houston, TX, ⁴University of Pittsburgh, Pittsburg, PA, ⁵University of Houston, Houston, TX

Sat–59
Design of Stereoscopic Visualization of Mastectomy Specimens for Augmented Reality Glasses
Emilio Loera¹,², Krista Nicklaus³, Mary Bordes¹, Juhun Lee⁴, Audrey Cheong⁴, Michelle Fingeret⁴, Fatima Merchant⁴, Gregory Reece⁴, and Mia Markey⁴
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX, ³The University of Texas MD Anderson, Houston, TX, ⁴University of Pittsburgh, Pittsburgh, PA, ⁵University of Houston, Houston, TX

Sat–60
Interactions Between the Immune System and Healthy Aging
Samuel Krause¹
¹University of North Carolina at Chapel Hill, Chapel Hill, NC
**Biomaterials - Undergraduate**

**Sat–221**
**Engineering Collagen Fibril Microstructure and Tuning ECM Stiffness to Study Migration Strategies Of Cancer Cells In 3-D Microenvironments**
Jiranuwat Sapudom¹, Raymond Chin¹,², Steve Martin¹, Liv Kalbitzer¹, and Tilo Pompe¹
¹Universität Leipzig, Leipzig, Germany, ²University of Rochester, New York, NY

**Sat–222**
**Calcium Phosphate Nanoparticle-Assisted Dissolving Microneedles for Transdermal DNA Delivery**
Abigail Magee¹, Min-Hua Chen², and Nobutaka Hanagata³
¹University of Central Oklahoma, Edmond, OK, ²National Institute of Materials Science, Tsukuba, Japan

**Sat–223**
**Varying Levels of Degradation in Synthetic Polymers In Vivo**
Rachel Slappy¹
¹University of Tennessee at Knoxville, Knoxville, TN

**Sat–224**
**Relative Effects of Substrate Stiffness on Neuronal Phenotype Modulation in 2D and 3D microenvironments**
Rachel Tchen¹, Rodrigo Zurita¹, Zach Nickle², Andrea Jimenez Vergara¹, and Dany Munoz Pinto¹
¹Trinity University, San Antonio, TX, ²McGill University, Montreal, QC, Canada

**Sat–225**
**Myoblast Response to Tissue Specific Extracellular Matrix Environments**
Nicole Friend¹, Jessica Ungerleider¹, and Karen Christman¹
¹University of California, San Diego, La Jolla, CA

**Sat–226**
**Characterizing the ECM Composition and Mechanical Properties of Ovarian Tissue-Derived Hydrogels**
Ziyu Xian¹,², Michael Buckenmeyer³, and Bryan Brown³
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

**Sat–227**
**A Personalized 3D Medpor Conformal Process Feasibility Study**
Jason Yang¹ and Amanda Nguyen¹
¹Arizona State University, Tempe, AZ

**Sat–228**
**Retention and Release of Model Drugs from Hydrogels Impregnated with Magneto-Liposomes**
Mickey Colombo¹, Ryan Lynn¹, Geoffrey Bothun¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

**Sat–229**
**The Properties of Hyaluronic Acid For Double Network Hydrogels**
Anna Hrbac¹, Alexander Jannini³, and Julie Hasenwanke³
¹University of Rochester, Manlius, NY, ²Syracuse Biomaterials Institute, Syracuse, NY

**Sat–230**
**Novel Poly[(1,8-octanediol)-co-(citric acid)-co-(suberic acid)] Scaffolds for Vascular Tissue Engineering**
Jacob Irwin¹, Gloria Kim², and Jian Yang²
¹Arizona State University, Tempe, AZ, ²Pennsylvania State University, State College, PA

**Sat–231**
**Design and Synthesis of Functionalized Polymers for 3D Printing Tissue Engineering Scaffolds**
Rachael Fan¹, Caroline Kaufman¹, Patricia Morales¹, Divya Patel¹, and Lesley Choy¹
¹Lehigh University, Bethlehem, PA

**Sat–232**
**The Effects of Different Shoe Inserts On Force Applied to the Foot**
Janki Patel¹, Caroline Merz², Amy Lloyd¹, and Ha Van Vo¹
¹Mercer University, Macon, GA

**Sat–233**
**Shear Stress in Stromal-Like Conditions is a Metric for Metastatic Potential**
Mackenzie Coston¹, Af sheen Banisadr², Pranjali Beri³, and Adam Engler³
¹University of Washington, Seattle, WA, ²University of California, San Diego, La Jolla, CA

**Sat–234**
**Highly Stretchable, Tough, and Thermo-responsive Hydrogels**
Serena Blacklow¹, Jianyu Li¹,², and David Mooney¹,³
¹School of Engineering and Applied Sciences at Harvard University, Cambridge, MA, ²Wyss Institute for Biologically Inspired Engineering at Harvard University, Boston, MA

**Sat–235**
**Live Cell Tracking of U87MG-EGFP Glioma Cells Encapsulated in 3D Brain-mimetic Hydrogel Scaffolds**
Kylie Balotín¹, Meghan Logun², and Lohitash Karumbiah²
¹Rice University, Houston, TX, ²University of Georgia, Athens, GA

**Sat–236**
**“Self-Fitting” Shape Memory Polymer, Semi-IPN Scaffolds for Cranial Defect Repair**
Vanessa Page¹, Melissa Grunlan¹, Lindsay Woodard¹, and Kevin Kmetz¹
¹Texas A&M University, College Station, TX

**Sat–237**
**Biomimetic Substrates for Mechanobiology Investigations of Pancreatic Cancer**
Wissam Fares¹, Abigail De La Pena¹, Andrés Rubiano¹, Codi Elliott², and Chelsey Simmons³
¹University of Florida, Gainesville, FL, ²Sarasota High School, Sarasota, FL

**Sat–238**
**Characterizing The Release of Therapeutic Agents from Thin Fibrin Membranes**
Alexandra Burr¹, Megan Chrobak¹, Meagam Carnes¹, George Pins¹, and Alexandra Burr¹
¹Worcester Polytechnic Institute, Worcester, MA

**Sat–239**
**Magnetic Freeze Casting with Surface Magnetized Hydroxyapatite for Bioinspired Bone Implants**
Cindy Ayala¹, Michael Frank², Louis Guibert³, Sze Hei Siu¹, Olivia A. Graeve¹, Joanna M. McKittrick¹, Keyur Karandikar¹, and Chin-Hung Liu¹
¹University of California- San Diego, La Jolla, CA, ²University of California- San Diego, La Jolla, CA, ³Department of Materials Sciences, École Polytechnique de l’Université de Nantes, France, Nantes, France

**Sat–240**
**3D Printed Haversian Scaffolds for Critical Bone Trauma**
Brian Ruliffson¹
¹UTSA, San Antonio, TX

**Sat–241**
**Synthesis and Electrical Characterization of PAn-PAAMPSA Nanofibers in PolyHEMA Hydrogels**
Blake Smith¹, John Aggas², Anthony Guiseppi-Elie³, and Jodie Lutkenhaus¹
¹Texas A&M University, College Station, TX
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| Sat-242  | 3D-Printed Dielectric Elastomer Actuators for Artificial Muscles and Soft Robotics | Julia Khoury¹ and Yigit Menguc¹  
¹Oregon State University, Corvallis, OR |
| Sat-243  | Digitizing Biological Signals Using a Biocompatible Sample and Hold Circuit | Earl Hughes III, John Aggas², and Anthony Guiseppi-Elie³  
²Hampton University, College Station, TX, ³Texas A & M, College Station, TX |
| Sat-244  | Induced Metastatic Breast Cancer Hyperthermia Using Composite Scaffolds | Heather Fong¹, Francisco Pelaez¹, Navid Manuchehrabadi¹, John Bischof¹, and Samira Azarin¹  
¹University of Minnesota-Twin Cities, Minneapolis, MN |
| Sat-245  | Neuropeptides Conjugated with DNA Structures Improve Diabetic Wound Healing | Richard Walsh¹  
¹Beth Israel Deaconness Medical Center, Boston, MA |
| Sat-246  | Demineralized Bone Matrix Fibers Support Adipose Mesenchymal Stem Cells and Mineralization In Vitro | Jacob DeRoo¹  
¹Colorado State University, Fort Collins, CO |
| Sat-247  | Change In The Binding Ability In Different 3D Printed Polyurethane Gels | Josue Campos¹, Pengrui Wang¹, and Shaochen Chen¹  
¹University of California San Diego, San Diego, CA |
| Sat-248  | Engineering Heparin-Binding Culture Substrates for Spatiotemporal Control of Human Embryonic Stem Cell-derived Neural Tissue Morphology | Brady Lundin¹, Gavin Knight¹, and Randolph Ashton¹  
¹University of Wisconsin-Madison, Madison, WI |
| Sat-249  | The Effect of Substrate Stiffness and ECM Protein Coating on Macrophage Activation | Emily Burcht¹, Jefferson Overlin¹, Kelly Hotchkiss¹, and Rene Olivares-Navarrete¹  
¹Virginia Commonwealth University, Richmond, VA |
| Sat-250  | Design of Biocompatible Chemical Crosslinkers for Tuning the Degradation in Polyethylene Hydrogels | Stephanie Kroger¹, Aaron Stock¹, Lindsay Hill¹, Era Jain¹, and Silviya Zustiak¹  
¹Saint Louis University, St Louis, MO |
| Biomechanics - Undergraduate | | |
| Sat-253  | Biomechanics Changes Following An Exercise Intervention In Females With Ehlers-Danlos Syndrome-Hypermobility Type Stratified By Age And Experience | Jennifer Mathews¹, Micah Garcia¹, Stephanie Sabo³, Matthew Kanetzk¹, and Jason Long¹  
¹Saint Louis University, Saint Louis, MO, ²Cincinnati Children’s Hospital Medical Center, Cincinnati, OH, ³University of Cincinnati, Cincinnati, OH |
| Sat-254  | Characterization Of Glucagon Via Electrochemical Impedence Spectroscopy In Complex Solution | Connor Beck¹, Aldin Malkoc³, David Probst¹, Mukund Khanwalker¹, Chi lin¹, and Jeffrey LaBelle¹  
¹Arizona State University, Tempe, AZ |
| Sat-255  | Cadaveric Modeling of Odontoid Fractures with Common Associated Ligamentous Injuries | Rahul Ramanathan¹, Nicholas Vaudreuil¹, Robert Tisherman¹, Rob Hartman¹, Joon Lee¹, and Kevin Bell¹ |
| Sat-256  | Physical Modeling of the Effects of Human Dural Membranes on Brain Biomechanics | Ramona Durham¹, Andrew Badachhape¹, Ruth Okamoto¹, Curtis Johnson², Dzung Pham², and Philip Bayly¹  
¹Washington University in St. Louis, St. Louis, MO, ²University of Delaware, Newark, DE, ³The Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda, MD |
| Sat-257  | Changes in Side-to-side Symmetry During a 2 Mile Run | Mackenzie Wenrick¹ and Robin Queen¹  
¹Virginia Tech, Blacksburg, VA |
| Sat-258  | Regional Differences In Viscoelastic Heating Of Tendon Due To Cylindrical Compression | Harrah Newman¹, Stephanie Kamau¹, and Amanda Tian¹  
¹University of Rochester, Rochester, NY |
| Sat-259  | Frequency-dependent Viscoelastic Heating In Cyclically Compressed Tendons | Stephanie Kamau¹, Harrah Newman¹, and Amanda Tian¹  
¹University of Rochester, Rochester, NY |
| Sat-260  | Influence of Posture on Thoracoabdominal Organs among 5th, 50th and 95th Percentile Male Subjects | Katelyn Greene¹, James Gaewsky², F. Scott Gayzik², and Ashley Weaver²  
¹UC Berkeley, Berkeley, CA, ²Wake Forest University, Winston-Salem, NC |
| Sat-261  | Relating Collagen Fiber Structure and Mechanical Properties in Healing Myocardial Scar Tissue | Abigail Tietgen¹ and Jeffrey Holmes¹  
¹University of Virginia, Charlottesville, VA |
| Sat-262  | Interaction between CT-based BMAT and Total Body Fat during Intentional Weight Loss in Older Adults | Elizabeth Lopez¹, Samantha Schoell², Caressa Hightower², Jack Rejeski³, Michael Walkup³, Ashley Weaver², and Kristen Beavers²  
²Arizona State University, Prescott Valley, AZ, ³Virginia Tech–Wake Forest University, Winston Salem, NC, ⁴Wake Forest University, Winston Salem, NC |
| Sat-263  | The Role of Hyaluronic Acid in Liver Cirrhosis and Hepatocellular Carcinoma | Abigail Lonerker¹, LiKang Chin¹, and Rebecca Wells¹  
¹University of Pennsylvania, Philadelphia, PA |
| Sat-264  | Quantification of Lymphatic Permeability via Near-Infrared Imaging | Mindy Ross¹, Tyler Nelson¹, and J. Brandon Dixon¹  
¹Georgia Institute of Technology, Atlanta, GA |
Sat–265
Recognition of Human Dynamic And Static Activity During Independent Time Periods Using Wearable Sensor
Austin Tielke¹, Gabrielle Mili², Christopher Frames³, Saba Rezvaniyan⁴, and Thurmon Lockhart⁵
¹Arizona State University, tempe, AZ, ²Arizona State University, Tempe, AZ

Sat–266
Hemodynamic Quantification of Magnetohydrodynamic Voltages through a Flow Phantom
Morgan DaSilva¹, Kevin Wu³, Stan Gregory⁴, Jonathan Murrow⁴, and Zion Tse⁵
¹University of Connecticut, Storrs, CT, ²University of Georgia, Athens, GA, ³Athens Regional Medical Center, Athens, GA

Sat–267
Effects of Inflammatory Bowel Disease on Bone Strength and Density during Early Life
Malik Snowden¹, Cory Lindeman², and Iwona Jasik³
¹University of Pittsburgh, Gambriills, MD, ²University of Illinois at Urbana-Champaign, Urbana, IL

Sat–268
Development of Kinematically Accurate Cervical Spine Model for Biomechanical Testing Optimization
Casey Weinstein¹,² and Philip Brown²
¹Arizona State University, Tempe, AZ, ²Wake Forest University, Winston-Salem, NC

Sat–269
Determining Static and Dynamic Movement Between Human Gender with Inertial Measurement Unit
Ryan Bridges¹, Sydney Connor¹, Seong Hyun Moon¹, Victoria Smith¹, Rahul Soangra¹, and Thurmon Lockhart¹
¹Arizona State University, Tempe, AZ

Sat–270
Bacterial Adhesive Dynamic Simulation of FimA Mutant With Low Uncoiling Force
Natacha Comandante Lou¹, Saugat Poudel¹, Maia Schumacher², Juan Vizcarra³, and Wendy Thomas⁴
¹University of Washington, Seattle, WA, ²Seattle University, Seattle, WA

Sat–271
Biomechanical Evaluation of Football Practice Drills in Youth Athletes
Alexander Lord¹, Mireille Kelley¹, Joel Sztigel¹, and Jillian Urban¹
¹Virginia Tech - Wake Forest School of Biomedical Engineering and Sciences, Winston-Salem, NC

Sat–272
Investigation of the Reliability Of AFM Nanoindentation-Derived Measurements of Cell Mechanics
Matthew Dragovich¹, Jared Feindt¹, Daniel Altmann¹, Cassandra Christman¹, Nathan DeRaymond¹, Ibrahim Hashmi¹, Adama Shaw¹, Katie Wu¹, Serge Ayinou¹, Felipe Torres¹, X. Frank Zhang¹, and Hannah Dailey¹
¹Lehigh University, Bethlehem, PA

Sat–273
Bone Microarchitecture and Strength Diminished in Mice with Chronic Kidney Disease and Aging
Danielle Howe¹, Chelsea Heveran², Eric Livingston³, Ted Bateman³, Karen King⁴, Moshe Leviv⁵, Virginia Ferguson⁶,⁷, and Anthony Lau¹
¹The College of New Jersey, Ewing, NJ, ²University of Colorado, Boulder, CO, ³University of North Carolina, Chapel Hill, NC, ⁴University of Colorado School of Medicine, Aurora, CO

Sat–274
Effect of Sliding-Induced Tribological Rehydration on Chondrocyte Viability in Cartilage Explant
David Sun¹, Michael Lan², Brian Graham³, Axel Moore³, David Burris³, and Christopher Price⁴
¹Washington University in St. Louis, St. Louis, MO, ²University of Delaware, Newark, DE

Sat–275
Contraction Wave Propagation in an Excitable Epithelial Tissue
David Denberg¹, Jonathan Rubin², and Lance Davidson¹
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh, Pittsburgh, PA

Sat–276
Effects of Mechanical Preconditioning on the Material Properties of Murine Cartilage
Chandler Wool¹, Alexander Kotelsky¹, and Mark R. Buckley¹
¹University of Rochester, Rochester, NY

Sat–277
Developing an in vivo, X-Ray Detectable Strain Sensing Device for Use in Dynamic Hip Screws
Bryce Kunkle¹, Nathan Carrington¹, Jeffrey Anker¹, John DesJardins¹, Thomas Pace², and Caleb Behrend³
¹Clemson University, Clemson, SC, ²Greenville Health System, Greenville, SC, ³Virginia Tech Carilion School of Medicine and Research Institute, Roanoke, VA

Sat–278
Analysis of Bone Strength Losses Due To Space Radiation
Alexander Borg¹, Dale Johnson¹, Summer Lawrence², Eric Livingston², Robert Hien³, Catherine Davis³, and Anthony Lau¹
¹The College of New Jersey, Ewing, NJ, ²University of North Carolina, Chapel Hill, Chapel Hill, NC, ³Johns Hopkins University, Baltimore, MD

Sat–279
Assessment of Strain in the Achilles Tendon Insertion During Exercise Using Ultrasound Elastography
Rachel E. Olson¹, Grace E. Weyand³, Mary A. Bucklin¹, Ruth L. Chimenti³, Michael S. Richards¹, and Mark R. Buckley¹
¹University of Rochester, Rochester, NY, ²North Western University, Manlius, NY, ³University of Iowa, Iowa City, IA

Sat–280
Case Study: Investigating Ideal Helmet Properties to Prevent Facial Fracture in Bicycle Accident
Brett Salazar¹, Mehmet Kurt¹, Michael Fenton¹, and David Camarillo¹
¹Stanford University, Stanford, CA

Sat–281
Development of Subject-Specific Musculoskeletal Models to Predict Quadriceps Strength
Brett Whorley¹,², Anthony Kulas³, and Zachary Domire¹
¹East Carolina University, Greenville, NC, ²University of Nebraska-Lincoln, Lincoln, NE

Sat–282
Amputee Gait During Load Carriage with An Energetically Passive And Powered Knee
Charles Humphries¹,², Andrea Brandt³, and He (Helen) Huang¹,²
¹North Carolina State University, Raleigh, NC, ²University of North Carolina Chapel Hill, Chapel Hill, NC

Sat–283
Effects of Cyclic Mechanical Strain on Human Breast Adenocarcinoma Behavior
Daniel Chavarria¹, Adrienne Spencer², Jason Lee³, Tamer Kaoud³, Kevin Dalby⁴, and Aaron Baker⁵
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX

Sat–284
Polyethylene Bearing Conformity Impacts Articular Constraint in Total Knee Replacements
Sean Flannery¹, Matthew Trowbridge¹, Kyle Snethen¹, and Melinda Harman¹
¹Arizona State University, Tempe, AZ

Sat–285
Gait and Limb Length Analysis using MatScan by Tekscan Software
Megan McKinney¹, Alex Tillery¹, and Ha Van Vo²
¹Mercer University, Cohutta, GA, ²Mercer University, Macon, GA
Sat–286
Increased Biofidelity of Simplified Human Body Models Through Compliant Element Implementation
Woojae Koh¹, Berkan Guleyupoglu², Bharath Koya³, and Francis Gayzik²
¹University of Maryland, College Park, MD, ²Wake Forest University
School of Medicine, Winston Salem, NC

Sat–287
Robust Method for Mechanical Testing of Rat Vertebrae to Determine Compressive Bone Properties
Jason M. Chang¹, Shannon R. Emerzian², Megan M. Pendleton³, Tony M. Keaveny⁴, and Grace D. O’Connell⁵
¹University of Texas at Dallas, Richardson, TX, ²University of California - Berkeley, Berkeley, CA

Sat–288
Comparative Gait Rehabilitation with Virtual Reality Headset
Kristin Ladia¹, Josiah Keime¹, Briana Corlew¹, and Derek Lura¹
¹Florida Gulf Coast University, Fort Myers, FL

Sat–289
Investigating the Impact of Biophysical Factors on Cell Adhesion and Fibroblast-to-Neuron Reprogramming
Giang Ha¹, Douglas Kelkoff¹, Jennifer Soto¹, Sze Yue Wong¹, and Song Li¹
¹University of California, Berkeley, Berkeley, CA, ²University of California, Los Angeles, Los Angeles, CA

Sat–290
Development and Mechanical Characterization of Gelatin-based Synthetic Blood Vessel Phantoms
Nicholas DeMaio¹
¹Rutgers University, Holmdel, NJ

Sat–291
Calculating Forces on the Femoral Head During Bridging Exercise Using OpenSim
Kyle Berkow¹, Navit Roth², and Orit Braun-Benyamin²
¹University of Pittsburgh, Pittsburgh, PA, ²ORT Braude College of Engineering, Karmiel, Israel

Sat–292
Comparative Analysis of Photogrammetry to Laser-Based Methods of Measuring the Physical Dimensions of Soft Tissues
Iman Benbourenane¹, Deanna Easley¹, Maurice Kotz¹, and Steven Abramowitch¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–293
Katelyn Axman¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–294
The Role of Substrate Stiffness in Epithelial to Mesenchymal Transition of Premalignant and Malignant Breast Epithelial Cells
Nadiah Hassan¹, Lauren Griggs¹, and Christopher Lemmon¹
¹Virginia Commonwealth University, Richmond, VA

Sat–295
Accurate Model of Moment Arms of the Elbow Flexors Using a Multiple Polynomial Equation Approach
Alexandra Deghand¹ and Zachary Domire²
¹Wichita State University, De Soto, KS, ²East Carolina University, Greenville, NC

Biomedical Engineering Education (BME) – Undergraduate

Sat–31
A Student-Taught Skills-Based Course to bring Research to the Introductory Biomedical Curriculum
Daniel Naveed Tavakol¹, Cara Broshkevitch¹, William H. Guilford¹, and Shayan M. Peirce¹
¹University of Virginia, Charlottesville, VA

Sat–32
Effect of GFP Expression and DiR labeling on DiR Fluorescence and Cytotoxicity of INSCs In Vitro
Courtney McClure¹,²
¹Delaware State University, Dover, DE, ²University of Georgia, Athens, GA

Sat–33
CT Perfusion Image Super-Resolution Using a Deep Convolutional Network
Paul Naghshineh¹, Peng Liu², and Ruogu Fang³
¹The George Washington University, Washington, DC, ²Florida International University, Miami, FL

Sat–34
Characterization of a Nanoparticle-hydrogel Ocular Drug Delivery System
Geeya Patel¹, Priyanka Ghosh¹, Emily Dosmar¹, and Jennifer Kang-Mieler¹
¹Illinois Institute of Technology, Chicago, IL

Sat–35
Development and Validation of a Brain Phantom for Therapeutic Cooling
Megan Fritz¹,², Ryan Pachter²,³, Philip Brown²,³, Guatam Popli⁴, and F. Scott Gayzik²,³
¹University of Illinois at Urbana-Champaign, Champaign, IL, ²Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences, Winston-Salem, NC, ³Wake Forest University School of Medicine, Winston-Salem, NC

Sat–36
Degradable Ceramic- Hydrogel Composite Scaffolds for Bone Tissue Engineering
Abigail Avila¹, Banu Akar¹, and Eric M. Brey¹
¹Illinois Institute of Technology, Chicago, IL

Sat–37
Optimization of Fibronectin Micro-contact Printing Protocol for Potential Nanoparticle Uptake Study
Laura McGimpsey¹, Pouria Fattahi¹, Justin L. Brown¹, and Peter J. Butler¹
¹Pennsylvania State University, Allentown, PA

Sat–38
GFP-HeLa Cell Viability in Sugar Augmented Alginate Bio Inks
Gabriel Garcia¹ and Thomas Boland¹
¹University of Texas at El Paso, El Paso, TX
**Biomedical Imaging and Optics—Undergraduate**

**Sat–62**
Efficient and Automated Neuronal Tracking on Global Brain Imaging with Point Registration.
Yun-Hsuan Lee1,2, Charles Zhao1, Kathleen Bates1, and Hang Lu1
1Georgia Tech, Atlanta, GA, 2Emory University, Atlanta, GA

**Sat–63**
Quantifying Quantum Dot Nanosensor Binding Affinities to Angiogenic Receptors via SPR-Based Assay
Jacob Ernsting1,2, Cassandra Jensen1, Samantha Schad2, Mallory Wall2, Spencer Mamer2, Si Chen2, and P.I. Imoukhuede2
1Florida International University, Miami, FL, 2University of Illinois at Urbana-Champaign, Urbana, IL

**Sat–64**
Dynamic Axial Biometry of the Eye in Accommodation using Extended-depth OCT
Keke Liu1,2, Yu-Cheng Chang1,2, Carolina de Freitas1,2, Alex Pham1,2, Florence Cabot1,2, Siobhan Williams1,2, Ethan Adre1,2, Giovanni Gregori4, Marco Ruggeri1,2, Sonia Yoo3, Arthur Ho1,2,3, Jean-Marie Parel1,2,4, and Fabrice Manns1,2
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 2Biomedical Optics and Laser Laboratory, Department of Biomedical Engineering, University of Miami College of Engineering, Coral Gables, FL, 3Anne Bates Leach Eye Hospital, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL, 4Quantitative Imaging Center, Bascom Palmer Eye Institute, University of Miami Miller School of Medicine, Miami, FL

**Sat–65**
An Automated Comparison of the Distribution of Extracellular Matrix Molecules in the Brain
Jessie Liu1 and Michel Modo1
1University of Pittsburgh, Pittsburgh, PA

**Sat–66**
Diffuse Correlation Tomography to Image Temporal and Spatial Changes of Blood Flow in a Mouse Model
Nathaniel Barber1, Songfeng Han1, Ashley Proctor1, Gabriel Ramirez1, Danielle Benoit1, and Regine Choe1
1University of Rochester, Rochester, NY

**Sat–67**
A Field-Deployable, Automatically-Tracking Microscope Stage for Microfluidic Systems
Vasilios Dounis1, Keith Heyde1, John Lake1, and Warren Ruder1
1Virginia Polytechnic Institute and State University, Blacksburg VA, VA

**Sat–68**
Resolving Coarse Fluorescence Molecular Tomography Images Using Boundary Conditions
Samweg Shah1, Pradeep Wyss1, Nicola Sebert1, Melika Sarem1, and V. Prasad Shastri2
1Western University, Windsor, ON, Canada, 2University of Freiburg, Freiburg, Germany

**Sat–69**
Structural Connectivity Analysis Can Predict Poor Walking Performance in Multiple Sclerosis
Jorge Maldonado1,2, Bradley Sutton1, Robert Motl1, and Elizabeth Hubbard3
1Universidad del Este, Carolina, PR, Puerto Rico, 2University of Illinois at Urbana Champaign, Urbana-Champaign, IL, 3University of Illinois at Urbana Champaign, Urbana-Champaign, IL

**Sat–70**
Towards Non-invasive Vascular Imaging of Murine Allografts with the Diffuse Optical Tomography
Haitong Wang1, Jingxuan Han1, Ashley R. Proctor1, Songfeng Han1, and Regine Choe1
1University of Rochester, Rochester, NY

**Sat–71**
Ultrasonic Shear Wave Imaging of Median Nerve
Thammathada Ketksiri1, Samantha Lipman1, Anna Knight1, Lisa Hobson-Webb3, and Kathryn Nightingale1
1Duke University, Durham, NC, 2Duke University School of Medicine, Durham, NC

**Sat–72**
Comparison of Novel CAD system and Histopathology for Volumetric Analysis of Prostate Cancer Lesions
Claire Kaiser1, Nathan Lay2, Baris Turkbey2, and Ronald Summers2
1University of Rochester, Rochester, NY, 2National Institutes of Health, Bethesda, MD

**Sat–73**
Accommodative Changes in the Internal Structure of the Lens Measured with SD-OCT
Ethan Adre1,2, Yu-Cheng Chang1,2, Marco Ruggeri1, Georgios Kontakakis1, Sonia Yoo3, Fabrice Manns1,2, and Jean-Marie Parel1,2
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, Miami, FL, 2University of Miami College of Engineering, Coral Gables, FL, 3Bascom Palmer Eye Institute, Miami, FL, 4Vision Cooperative Research Center, Sydney, Australia

**Sat–74**
Biometry Of The Aging Human Lens Using Optical Coherence Tomography: Thickness And Curvature
Alex Pham1,2, Yu-Cheng Chang1,2, Ethan Adre1,2, Florence Cabot1,2, Ivan Shestopalov1,2, Keke Liu1,2, Siobhan Williams1,2, Giovanni Gregori4, Marco Ruggeri1,2, Sonia Yoo3, and Jean-Marie Parel1,2
1Ophthalmic Biophysics Center, Bascom Palmer Eye Institute, Miami, FL, 2University of Miami College of Engineering, Coral Gables, FL, 3Anne Bates Leach Eye Hospital, Bascom Palmer Eye Institute, Miami, FL, 4Quantitative Imaging Center, Bascom Palmer Eye Institute, Miami, FL, 5Vision Cooperative Research Center, Sydney, Australia

**Sat–75**
Single-Molecule Analysis of Cytokine-Induced Macrophage Polarization using Quantum Dots
Sophie Xie1, Phuong Le2, and Andrew Smith2
1Vanderbilt University, Nashville, TN, 2University of Illinois at Urbana-Champaign, Urbana, IL

**Sat–76**
Three-Dimensional Reconstruction of In Vivo Murine Cardiovascular System
Grey Braybrooks1, Olivia Palmer1, and Joan Greve1
1University of Michigan, Ann Arbor, MI

**Sat–77**
Image Analysis Method for All-Optical Stimulation and Recordings from Neurons in Culture
Denise M. Almora1, Javier I. Suarez2, and Stephen A. Boppart2
1Florida International University (FIU), Miami, FL, 2University of Illinois at Urbana-Champaign, Urbana, IL

**Sat–78**
Breast Cancer Detection by an Infrared Imager: Evaluating the Thermal Resolution
Nada Kamona1 and Murray Loew1
1The George Washington University, Washington, DC

**Sat–79**
Imaging Biomechanical Properties of Soft tissue with Artificial Neural Networks
Wendy Reyes1, Cameron Hoerig1, LéoS Fabre3, Jamshed Ghabousi4, and Michael F. Insana1
1The Catholic University of America, Washington, DC, 2University of Illinois Urbana-Champaign, Urbana, IL, 3Ecole Centrale de Lille, Cité Scientifique, France, 4University of Illinois at Urbana-Champaign, Urbana, IL
Sat–80 Investigating Methods of Signal Interpolation in Synthetic Aperture Ultrasound Imaging
Kathleen Larson¹ and Stephen McAlavey¹
¹University of Rochester, Rochester, NY

Sat–81 IR Imaging Detects Biochemical Changes in Steatohepatitis Progression in the Liver
Christine Massie¹, Hari Sreedhar¹, Vishal Varma¹, Grace Guzman¹, Natalia Nieto¹, and Michael Walsh¹
¹University of Illinois at Chicago, Chicago, IL

Sat–82 Skeletal Visualization in Rat Embryos Using Optical Projection Tomography and a Novel Clearing Agent
Alexander Magasam¹ and Mark Pierce²
¹University of Nebraska-Lincoln, Lincoln, NE, ²Rutgers, The State University of New Jersey, Piscataway, NJ

Sat–83 Characterization of Survival And Proliferation In Glioblastoma Mouse Models
Brooke Braman¹, Chao Liu¹, Ghaidan Shamsan¹, Rebecca Klank¹, Stephen McFarren¹, Barbara Tschilda¹, Steven Rosenfield³, David Largaespada¹, and David Odde¹
¹University of Minnesota, Twin Cities, Minneapolis, MN, ²Cleveland Clinic, Cleveland, OH

Sat–84 Computerized Analysis of Breast Cancer Microenvironment Through Fourier Transform Infrared (FT-IR) Spectroscopy and Machine Learning
Matthew Kavanagh¹, Saumya Tiwari², and Rohit Bhargava²
¹University of Kansas, Leawood, KS, ²University of Illinois, Urbana, IL

Sat–85 Real-Time 3D Reconstruction for Biomedical Systems
Jose Botello¹ and Zhen Zhu²
¹East Carolina University, Tarboro, NC, ²East Carolina University, Greenville, NC

Sat–86 Atomic Force Microscopy of Plasmodium falciparum Lipid Rafts and GPI-Anchored Proteins
Alison Long¹,², Albert Jin¹, and David Narum³
¹University of California Berkeley, Temecula, CA, ²National Institute of Biomedical Imaging and Bioengineering, Bethesda, MD, ³Laboratory of Malaria Immunology and Vaccinology, Rockville, MD

Sat–87 Optical Imaging of Cell Metabolism in Metastatic and Non-metastatic Breast Cancer Cells
Kinan Alhallak¹, Lisa Rebello¹, Timothy Muldoon¹, Kyle Quinn¹, and Narasimhan Rajaram²
¹Arkansas, Fayetteville, AR

Sat–88 Large Field of View Single Pixel Interference Projection Imaging
Robert Stokoe¹, Patrick Stockton¹, Jeffrey Field¹, and Randy Bartels¹
¹Colorado State University, Fort Collins, CO

Sat–89 Luminescent Porous Silicon as Single Particle Ratiometric Probes
Mollie Sewell¹, Geoffrey Hollett¹, David Roberts², and Emma Wensley²
¹North Carolina A&T State University, Greensboro, NC, ²University of California San Diego, La Jolla, CA

Sat–90 Automatic Analysis of 3D Engineered Muscle Contractions with Digital Image Processing
Steven Pirvu¹, Hyeonju Kim², and H. Harry Asada²
¹Louisiana Tech University, Ruston, LA, ²Massachusetts Institute of Technology, Cambridge, MA

Sat–91 Exploring Iron Oxide Response Under Biological Conditions Using Magnetic Particle Spectroscopy
Daniel Pretridge¹,², Rohan Dhavalikar¹, Ana Bohorquez¹, Nicolas Garraud¹, Mythreyi Unni¹, Andreina Chiu-Lam¹, David Arnold¹, and Carlos Rinaldi¹
¹University of Florida, Gainesville, FL, ²Santa Fe College, Gainesville, FL

Sat–92 Towards Spectrally-Resolved Super-Resolution Microscopy Using a Spatial Light Modulator
Sravan Munagavalaša¹, Bryce Schroeder¹, and Shu Jia¹
¹Stony Brook University, Stony Brook, NY

Sat–93 Development of a 3D-printed Laser Speckle Contrast Imaging System
Dylan Beam¹,², Colin Sullivan², Jeremy Arkin², Lisa Richards², and Andrew Dunn²
¹The Ohio State University, Columbus, OH, ²The University of Texas at Austin, Austin, TX

Sat–94 Dynamic Model to Optimize Ultrasound Elasticity Imaging of Tendon for Assessment of Tendinopathies
Hannah Schmitz¹, Liang Gao², Andres Nuncio Zuniga³, Cindy Fastje¹, Miha Taljanovic¹, Daniel Latt¹, and Russell Witten³
¹University of Arizona, Tucson, AZ, ²University of Washington, Seattle, WA

Sat–95 Quantitative Ultrasound Techniques used in the Detection of Fatty Liver
Shaun Meyer¹, Lynn Gerber¹, Siddhartha Sikdar¹, Hussain Allawi³, and Zobair Younossi³
¹George Mason University, Fairfax, VA, ²INOVA, Falls Church, VA, ³Betty and Guy Beatty Center for Integrated Research Inova, Falls Church, VA

Cancer Technologies - Undergraduate

Sat–103 Metabolic Profiling of Macrophages Conditioned in Glioblastoma Stem Cell Environments
Victoria Lee¹, Travis Salzillo¹, and Pratip Bhattacharya¹
¹The University of Texas MD Anderson Cancer Center, Houston, TX

Sat–104 The Effect of Salinomycin On Glioblastoma Cancer Stem Cells
Justin Magrath¹ and Yonghyun Kim¹
¹The University of Alabama, Tuscaloosa, AL

Sat–105 Effects of Tasquinimod, An Inhibitor of S100A9 in Breast Cancer Metastasis
Tiffany-Rae Robinson¹
¹Western New England University, Dalton, MA

Sat–106 Examining the 3D Tumor Microenvironment Via Microbioreactors
Matthew Rogers¹, Tammy Sobolik¹, David Schaffer³, Philip Samson¹, John Wikswo¹, and Ann Richmond²,³
¹Vanderbilt University, Nashville, TN, ²Vanderbilt University Medical Center, Nashville, TN, ³Tennessee Valley Healthcare System, Nashville, TN

Sat–107 Bioorthogonal Conjugated Probes for Enhancing Tumor Cell Imaging
Jasmin Vanessa Guerrero¹, Irma Fernandez², Maha K. Rahim², and Jereid B. Haun²
¹University of California, Irvine, Santa Barbara, CA, ²University of California, Irvine, Irvine, CA
Sat-108  The Effect of Fluid Shear and Metastatic Potential on Breast Cancer Cell Migration  
Jae Hyun Lim¹, Brandon Riehl², Ravi Raghani³, Jeong Soon Lee², and Jung Yul Lim⁴  
¹Lincoln Southwest High School, Lincoln, NE, ²University of Nebraska-Lincoln, Lincoln, NE

Sat-109  A 3-D Model of Breast Tumor and Endothelial Cell Interactions  
Olivia Ngo¹, Swathi Swaminathan⁴, and Alisa Morss Clyne⁴  
¹Drexel University, Philadelphia, PA

Sat-110  Influence of Tumor Microenvironment Mechanics on Myoferlin-Mediated Changes in Breast Cancer Cell Migration  
Kelsey Watts¹, Vavusha Shukla¹, and Samir Ghadiali¹  
¹The Ohio State University, Columbus, OH

Sat-111  Ionic Driven Embedment of Lipid Nanoparticles in Polymer Films for Local Therapeutic Delivery  
Stephen Hayward¹, David Francis², Matthew Sis³, and Sivratnas Kidambí⁴, ⁵  
¹University of Michigan–Ann Arbor, Ann Arbor, NE, ²Georgia Institute of Technology, Atlanta, GA, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska-Lincoln, Lincoln, NE, ⁵University of Nebraska Medical Center, Omaha, NE

Sat-112  Gut Microbiota Modulates Cisplatin Induced Systemic Toxicity  
Miranda Dawson¹, Soumen Roy², Amiram Dzutsev³, Gianluca Pegoraro⁴, and Giorgio Trinchieri⁵  
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²National Cancer Institute, National Institutes of Health, Bethesda, MD

Sat-113  Breast Cancer Cell Behavior on Electrospun Fibrous Scaffolds  
Alston-Lauren Feggins¹, Alicja Allen², and Janet Zoldan³  
¹Florida Institute of Technology, Melbourne, FL, ²University of Texas at Austin, Austin, TX

Sat-114  The Effects of Hemodynamic Stress on Stemness of Acute Myelogenous Leukemia  
Andrew Raddatz¹, Ursula Triantafillu¹, and Yonghyun (John) Kim¹  
¹The University of Alabama, Tuscaloosa, AL

Sat-115  M1 Macrophage Polarization Decreases with an Increase of Stiffness  
Adiel Hernandez¹, Shane Allen¹, and Laura Suggs²  
¹University of Miami, Miami, FL, ²The University of Texas at Austin, Austin, TX

Sat-116  Use of EGFR Tracking in Detection of Epithelial-Mesenchymal Transition in Cancer Cells  
Hannah Horning¹, Yen-Liang Liu², Chun-Liang Chen², and Hsin-Chih Yeh²  
¹University of Maryland, College Park, Derwood, MD, ²The University of Texas at Austin, Austin, TX, ³UT Health Center at San Antonio, San Antonio, TX

Sat-117  The Feasibility and Optimization of a Percutaneous Carbon Dioxide-based Cryoprobe  
Bailey Surtrees¹, Sarah Lee¹, Ben Lee¹, Sonia Trakru¹, Monica Rex¹, Yechan Kang¹, Nikhil Jois¹, and Alwin Hui¹  
¹Johns Hopkins University, Baltimore, MD

Sat-118  PC3 Detachment from Surface-Modified Scaffolds in 3D Perfusion Bioreactors  
Gabriel Ratcliffe¹, Cortes Williams⁴, and Vassilios Sikavitsas⁵  
¹University of Oklahoma, Norman, OK

Sat-119  Anti-tumor (M1) Macrophages Secrete Cytokines that Prime Breast Cancer Cells for Apoptosis  
Maja McKeown¹, Jennifer Guerriero², and Anthony Letai²  
¹University of Pittsburgh, Pittsburgh, PA, ²Dana-Farber Cancer Institute, Boston, MA

Sat-120  The Effect of Degraded Collagen upon the Epithelial-Mesenchymal Transition in Cancer Progression  
Pierce Hadley¹,², Mark Gryka²,³, Saumya Tiwari¹,³,⁴, Nicolas Spengazzini¹,³, and Rohit Bhargava²,³  
¹University of Illinois (Urbana-Champaign), Urbana, IL, ²Beckman Institute for Advanced Science and Technology, Urbana, IL

Cardiovascular Engineering—Undergraduate

Sat-192  The Fluid Mechanics of Aortic Regurgitation—A Simplified Experiment  
Samantha Houser¹, Ikehukwu Okafor¹, Drishank Raghav¹, and Ajit Yoganathan¹  
¹Georgia Institute of Technology, Atlanta, GA

Sat-193  Lumped Parameter Modeling of the Left Ventricle to Study Energy Loss during Aortic Regurgitation  
Elizabeth Stayduhar¹, Drishank Raghav¹, Ikehukwu Okafor¹, and Ajit Yoganathan¹  
¹Georgia Institute of Technology, Atlanta, GA

Sat-194  A Flow Bioreactor Enabling Simultaneous High-Resolution Microscopy of Monolayer Cultures  
Zachary Davis¹, Julia Brekke¹, Nian Shen¹,², Michael Monaghan¹,², Katja Schenke-Layland¹,²,³, and Shannon Layland²  
¹Eberhard Karls University, Tübingen, Germany, ²Fraunhofer Institute for Interfacial Engineering and Biotechnology, Stuttgart, Germany, ³University of California, Los Angeles, CA

Sat-195  Single Institution Experience in 3D Modeling of Congenital Heart Defects  
Alex Demers¹, Robert Hannan²,³, Robert Wesley²,³,⁴, and Juan Carlos Muniz²,³  
¹Miami University, Oxford, OH, ²Nicklaus Children’s Hospital, Miami, FL, ³Florida International University Herbert Wertheim College of Medicine, Miami, FL

Sat-196  Fabrication of Patient-Specific Intracranial Aneurysm Models For Burst Testing  
Toby Zhu¹, Joseph Pichamuthu¹, Hritwick Banjee¹, Hongliang Ren², Justin Weinbaum¹, and David Vorp¹  
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore

Sat-197  Cardiomyocyte Differentiation on Polyurethane Nanofibers for Cardiac Tissue Engineering  
Hannah Shield¹, Akanksha Shradhanjali², Mohammad Andalib², and Jung Yul Lim²  
¹Emporia State University, Emporia, KS, ²University of Nebraska-Lincoln, Lincoln, NE
Sat-198 Extracellular Matrix Remodeling Due to Hypoxia in Porcine Aortic and Mitral Valves
Qiaochu Zhang¹, Varun Krishnamurthy¹, Matthew Sapp¹, Dragoslava Veklov¹, and Jane Grande-Allen¹
¹Rice University, Houston, TX

Sat-199 Use of Neural Networks to Predict Peripheral Artery Pathology
Andreas Seas¹, Jason MacTaggart², Marisoe Castellanos³, and Alexey Kamensky³
¹University of Maryland, Baltimore County, Ellicott City, MD, ²University of Nebraska Medical Center, Omaha, NE

Sat-200 Optogenetics for the Maturation of hiPS-CMs
Christopher Shen¹, Stephen Ma¹, Olaia Vila¹, and Gordana Vunjak-Novakovic¹
¹University of California, Irvine, CA

Sat -201 Optimization of a Decellularization Technique for the Study of Human Mitral Valve Interstitial Cells
Ethan Kwan¹, Elizabeth Shih¹, Connor Hughes¹, Kayla Walter¹, Salma Ayoub¹, and Michael Sacks¹
¹The University of Texas Austin, Austin, TX

Sat-202 Modeling and in-silico Analysis of Clinically Used Coronary Artery Stents
Jacob Herman¹, Zhi Ang²
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore

Sat-203 Studying The Restorative Feature of Stem Cells Through Mitochondrial Transfer
David Templeton¹, Xiaoqi Yang¹, Raymond Runyan², and Bruce Gao¹
¹Clemson University, Clemen, SC, ²University of Arizona, Tucson, AZ

Sat-204 Investigating Cellular Defects Arising from the LMNA Mutation
Zachery Robinson¹, Jason Core¹, Hamza Atcha¹, Waleed Dahbour², and Anna Grosberg³
¹University of California, Irvine, fontana, CA, ²University of California, Irvine, Irvine, CA

Sat-205 Design of a Versatile Physical Model of Multi-Lymphangion Systems
Luke Rixinger¹, James Baish¹, and Lance Munn³
¹Bucknell University, Lewisburg, PA, ²Harvard Medical School, Boston, MA, ³Massachusetts General Hospital, Boston, MA

Sat-206 CLARITY Optimization of Cardiac Tissue
Devon Guerrelli¹, Aaron Koppel¹, Jaclyn Brennan¹, and Igor Efimov¹
¹The George Washington University, Washington, DC

Sat-207 Stress Analysis of Pulmonary Autograft in One Year Postoperative Ross Patients
Matthew Zweber¹, Jing Liu¹, Yue Xuan¹, Ismail El-Hamamsy¹, Elaine Tseung¹, and Liang Ge¹
¹San Francisco VA Medical Center, San Francisco, CA

Sat-208 Isolation of The Opposing Effects of Fluid Mechanical Forces On Endothelial Sprouting
Griffin Spychalski¹, Ehsan Akbari¹, Kaushik Rangharajan¹, Shaurya Prakash¹, and Jonathan Song¹
¹The Ohio State University, Columbus, OH, ²OSU Comprehensive Cancer Center, Columbus, OH

Sat-209 Characterizing a Magnetic Bead Microrheometry System to Measure the Local Elasticity of Thrombi
Ryan Betzold¹, Peter Butler¹, and Keefe Manning¹,²
¹The Pennsylvania State University, University Park, PA, ²Penn State Hershey Medical Center, Hershey, PA

Sat-210 Sarcomeric Addition under Uniaxial Stress Loads
Tiffany Yu¹, Zhonghai Wang², and Bruce Gao²
¹Clemson University, Central, SC, ²Clemson University, Clemson, SC

Sat-211 Influence of Variations in Circle of Willis Anatomy on Cerebral Circulation & Embolus Distribution
Neel Jani¹, Debjanai Mukherjee¹, and Shawn Shaddon¹
¹UC Berkeley, Berkeley, CA

Sat-212 Trypsin Upregulates Membrane PDGFR Localization
Dipen Kumar¹, Si Chen¹, and Princess Imoukhuede¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Sat-213 Changes in Pulmonary Arterial Hemodynamics Prior To LVAD Implant and The Association with RV Failure
Courtney Vu¹, Timothy Bachman¹, Luigi Lagazzi¹, Robert Kormos¹, and Marc Simon¹
¹University of Pittsburgh, Pittsburgh, PA

Sat-214 The Virtual Implantation of the Penn State Pediatric Total Artificial Heart
Shyanthony R Synigal¹, Keefe B Manning², and William J Weiss³
¹Louisiana Tech University, Ruston, LA, ²Pennsylvania State University, University Park, PA, ³Pennsylvania State Hershey Medical Center, Hershey, PA

Sat-215 Effect of DRP Additives on Leukocytes in Microvessels: A Potential Method to Reduce Inflammation
Soumya Vhasure¹,², Daniel Crompton¹,², and Marina Kameneva³
¹University of Pittsburgh, Pittsburgh, PA, ²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

Sat-216 Developing a LabVIEW Virtual Instrument for a Planar Biaxial Bioreactor System
Lindsay Lehman¹, Brenda Rodriguez¹, Annie Mara¹, Ethan Kwan¹, Salma Ayoub¹, and Michael Sacks¹
¹The University of Texas Austin, Austin, TX

Sat-219 Effect of DRP Additives on Thrombocytes in Microvessels: A Potential Treatment for Thrombosis
Siddharth Balakrishnan¹, Dan Crompton², and Marina Kameneva²
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh, Pittsburgh, PA

Sat-220 Right Ventricular Function in a Simian Immunodeficiency Virus Model of Early Pulmonary Hypertension
Ian Christman¹, Rebecca Vanderpool², Rebecca Tarantelli³, Karen Norris³, and Marc Simon³
¹University of Pittsburgh, Pittsburgh, PA, ²Pittsburgh Vascular Medicine Institute, Pittsburgh, PA, ³University of Pittsburgh Department of Immunology, Pittsburgh, PA

Sat-221 Effect of DRP Additives on Thrombocytes in Microvessels: A Potential Treatment for Thrombosis
Siddharth Balakrishnan¹, Dan Crompton², and Marina Kameneva²
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh, Pittsburgh, PA

Sat-222 On Endothelial Sprouting
Griffin Spychalski¹, Ehsan Akbari¹, Kaushik Rangharajan¹, Shaurya Prakash¹, and Jonathan Song¹
¹The Ohio State University, Columbus, OH, ²OSU Comprehensive Cancer Center, Columbus, OH

Sat-200 Isolation of The Opposing Effects of Fluid Mechanical Forces On Endothelial Sprouting
Griffin Spychalski¹, Ehsan Akbari¹, Kaushik Rangharajan¹, Shaurya Prakash¹, and Jonathan Song¹
¹The Ohio State University, Columbus, OH, ²OSU Comprehensive Cancer Center, Columbus, OH
**Cellular and Molecular Bioengineering—Undergraduate**

**Sat-296**  
Effect of Extracellular Matrix Strain in Triggering Myofibroblastic Differentiation  
Jacqueline Larouche¹, John Nicosia¹, and Thomas Barker²  
¹Georgia Institute of Technology, Atlanta, GA, ²University of Virginia, Charlottesville, VA

**Sat-297**  
Establishing a Biological Switch for the Inducible Overproduction of Farnesyl Pyrophosphate  
Shreya Udani¹, Andrew Younger¹, Andrea Shepard¹ and Joshua Leonard¹  
¹Northwestern University, Evanston, IL

**Sat-298**  
Tagging Endogenous Genes Using a Universal Nuclease Assisted Vector Integration System  
Nikhil Shiva¹, Alexander Brown¹, Wendy Woods¹, and Pablo Perez-Pinera¹  
¹University of Illinois at Urbana-Champaign, Urbana, IL

**Sat-299**  
Investigating the Role of Vinculin Tension in Cell Spreading and Polarization  
Karen Xu¹  
¹Duke University, Durham, NC

**Sat-300**  
Construction of Pancreatic Islet-Mimetics by Optimizing Three-Dimensional MIN6 Cell Culture  
Connor Verheyen¹, Jessica Lin¹,², Jacob Anderson², Adam Rossano², Thomas Burghardt², Clinton Rubin¹, and Mei Lin Chan¹  
¹State University of New York Stony Brook, Stony Brook, NY, ²Kings Park High School, Kings Park, NY

**Sat-301**  
Molecular Genetic Analysis of an In Vitro Model of Chronic Coxsackieviral Infection  
Elise Gray-Gaillard¹, Millie Shah¹, Christian Smolko¹, and Kevin Janes¹  
¹University of Virginia, Charlottesville, VA

**Sat-302**  
Engineering Macrophages to Eat Solid Tumors by Inhibiting “Self” Signaling  
Brandon Hayes¹, Cory Alvey¹, Jake Hsu¹, and Dennis Discher¹  
¹University of Pennsylvania, Philadelphia, PA

**Sat-303**  
Precise Quantitation of Single DNA Molecules Bound to Protein  
Lauren Pruett¹, Hidetaka Ohnuki², and Giovanna Tosato²  
¹Clemson University, Clemson, SC, ²National Institutes of Health, National Cancer Institute, Bethesda, MD

**Sat-304**  
Modulation of Cancer-Associated Fibroblast Contractility Quantified by 3D Image Analysis  
Brian Hughes¹, Mary-Kathryn Sewell-Loftin¹, Elizabeth Crist¹, Samantha van Hove¹, Gregory Longmore¹, and Steven George¹  
¹Washington University in St. Louis, St. Louis, MO, ²Washington University in St. Louis School of Medicine, St. Louis, MO

**Sat-305**  
The Effects of Amyloid Beta and Mechanical Stretch on Astrocyte Activation  
Sruti Bheri¹, Julia Raykin¹, John Mulvihill¹, Laura Weinstock¹, Levi Wood¹, and C. Ross Ethier¹  
¹Georgia Institute of Technology, Atlanta, GA

**Sat-306**  
High-Throughput Functional Screening for Influenza HA Antigenic Drift Variants using Drop Based Microfluidics  
Elina Davel¹, ²  
¹Harvard University, Cambridge, MA, ²Union College, Schenectady, NY

**Sat-307**  
Ca²⁺ Response in Endothelial Cells Exposed to Different Flows: Experiments and Mathematical Modeling  
Alexander Cetnar¹, Christopher Scheitlin¹, Richard Buckalew¹, and B. Rita Alevriadou¹  
¹The Ohio State University, Columbus, OH

**Sat-308**  
Inhibition of an RTX Toxin Using Small, Receptor-Based Peptides  
Shannon Hayes¹  
¹Lehigh University, Bethlehem, PA

**Sat-309**  
Role of Desmosome and Nuclear LINC Complex Forces in Cardiomyocytes  
Nicole Duggan¹, Paul Arsenovic¹, and Daniel Conway¹  
¹Virginia Commonwealth University, Richmond, VA

**Sat-310**  
How the Stiffness of the Microenvironment Affects Breast Cancer Cells’ Drug Resistance  
Rachel Hegab¹, Marshall Joyce², and Amy Brock²  
¹Louisiana Tech University, Ruston, LA, ²The University of Texas at Austin, Austin, TX

**Sat-311**  
Point-of-Care Lysis and Amplification Of Neonatal Sepsis Causing Pathogens  
Gregory Berglund¹, Elizabeth Phillips¹, and Jacqueline Linnes¹  
¹Purdue University, West Lafayette, IN

**Sat-312**  
The Protective Role of Rndothelial Glycocalyx in Regards to oxLDL Uptake in Cell Culture Studies and Atherosclerotic Mice Models  
Irina Ahn¹, Gerard O’Neil¹, Ashlee Asada¹, Ming Cheng¹, Ning Hua², Ian Harding³, James Hamilton⁴, and Enno Ebbing³  
¹Northeastern University, Boston, MA, ²Boston University, Boston, MA

**Sat-313**  
Utility of a Low Volume Imaging Assay to Assess the Granular Phenotype and Activity of Neonatal Platelets  
Marisa Thierheimer¹, Anh Ngo¹, Sandra Baker-Groberg¹, Ayesha Khader¹, Joseph Aslan¹, Susan Lattimore¹, Michael Recht¹, Kristina Haley¹, and Owen McCarty¹  
¹Oregon Health & Science University, Portland, OR

**Sat-314**  
Low-Intensity Mechanical Vibrations Increase Cytoskeleton Flows: Experiments and Mathematical Modeling  
Robert Bruce¹, Renata Bruno², Stefanie Blanco¹, Yusef Saad-Eldin¹, Clinton Rublin¹, and Mei Lin Chan¹  
¹State University of New York Stony Brook, Stony Brook, NY, ²Kings Park High School, Kings Park, NY

**Sat-315**  
Adaptive PCR Enables Detection of Nucleic Acid Biomarkers in Urine with No Sample Preparation  
Austin Hardcastle¹, Nicholas Adams³, and Rick Haselton¹  
¹Vanderbilt University, Nashville, TN

**Sat-316**  
Assessing Slc26a6 & NaDC1 (INDY) Interaction on Calcium Oxalate Crystal Formation in a Drosophila Model of Kidney Stones  
Jessica Lin¹, Jacob Anderson², Adam Rosanno², Thomas Burghardt², and Michael Romero²  
¹Washington University in St. Louis, St. Louis, MO, ²Mayo Clinic College of Medicine, Rochester, MN
## Poster Session—Saturday

**Saturday, October 7 | 9:30 am–1:00 pm | Poster Session | Exhibit Hall BC**

| Sat–317 | Biological Response of Superficial Zone Chondrocytes To Combined Compression And Shear | Sarina Veale¹, Matt Gong¹, Felix Hsu¹, and Robert Sah¹  
¹University of California San Diego, La Jolla, CA |
| Sat–318 | The Soluble Effects of Microgravity-Exposed Osteocytes on Bone Resorption | Sharon Truesdell¹, Estee George¹, Soham Mukherjee¹, and Marnie Saunders¹  
¹University of Akron, Akron, OH |
| Sat–319 | Bio Logic Gate: AND Gate Constructed in Cyanobacteria | Kevin Walsh¹, Aidan Ceney¹, Sharon Lian¹, Sam Mellentine¹, Dylan Miller¹, Jen Steyaert¹, and Christie Peebles¹  
¹Colorado State University, Fort Collins, CO |
| Sat–320 | Using CRISPR/Cas9 to Assess the Role of Rif1 In DNA End-processing During Non-homologous End Joining In Saccharomyces cerevisiae | Stephen Lee¹ and Katherine Friedman²  
¹Searle Systems Biology and Bioengineering Undergraduate Research Program, Vanderbilt University, Nashville, TN, ²Department of Biological Sciences, Vanderbilt University, Nashville, TN |
| Sat–321 | Long-term Expression of Cathepsin K Induces Unexpected Proteolytic Feedback to Maintain Proteostasis | Marc Shuler¹, Meghan Ferrall-Fairbanks², Maurizio Affero², and Manu Flatt²  
¹The Pennsylvania State University, Philadelphia, PA, ²Georgia Institute of Technology, Atlanta, GA |
| Sat–322 | HSPG Glypican-1 as a Primary Mechanosensor for NO Production in RFPECs | Anne Marie Weber¹, Rick Mathews¹, and John Tarbell¹  
¹The City College of New York, New York, NY |
| Sat–323 | Laser Ablation of Epithelial Sheets: Guidance on the Role of Biomechanics from Physical Analogs | Aiden Reuter¹  
¹University of Pittsburgh, Wexford, PA |

### Device Technologies and Biomedical Robotics - Undergraduate

| Sat–310 | Preliminary Development of a Flexible Drill for Robotic Minimally Invasive Transoral Surgical System | Michelle Botyrius¹,², Quanquan Liu¹, and Hongliang Ren¹  
¹University of Pittsburgh, Pittsburgh, PA, ²National University of Singapore, Singapore, Singapore |
| Sat–311 | Development of the 1DoF Haptic Renderer: Controller-Based Membrane Modeling for Haptic Devices | Avin Khera¹, Randy Lee¹, Zhixuan Yu¹, Roberta Klatzky¹, and George Stetten²  
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA |
| Sat–312 | Path Oriented Powered Wheelchair Navigation Assistance | Jason Dekarske¹  
¹UW-Madison, Sheboygan, WI |
A Potentially Low-Cost, Customized Stroke Rehabilitation Tool: Assist in Small Steps

Mohiuddin Ahmed¹, Peter Cooman², Tim Tang¹, Felix Huang³, and James Patton¹
¹University of Illinois at Chicago, Chicago, IL, ²Rehabilitation Institute of Chicago, Chicago, IL, ³Northwestern University, Evanston, IL

Drug Delivery - Undergraduate

Inhibition of Glioma Tumor Growth Using Hyaluronan Targeting Nanoparticles to Modify Brain Extracellular Matrix
Sayeduzzaman Khan¹, Nitish Yeredla¹, and Mathumai Kanapathipillai¹
¹University of Michigan - Dearborn, Dearborn, MI

Degradable Poly(ethylene glycol) Hydrogels For Temporal Control Of Nanoparticle-mediated SiRNA Delivery
Sue Zhang¹, Yuchen Wang¹, and Danielle Benoit¹
¹University of Rochester, Rochester, NY

Novel PEG-OES Nanocarriers for Local Immunomodulation in Pancreatic Islet Grafts
Connor Walsh¹, Diana Velluto², Vita Manzoli²,³, and Alice A. Tomei¹
¹Pratt School of Engineering, Durham, NC, ²Duke University, Durham, NC, ³University of Miami - Miller School of Medicine, Miami, FL

Controlled Release of Immuno-modulatory Small Molecules from Poly(lactide-co-glycolide) Films.
Zachary Brown¹, Mohammad Arifuzzaman², Fan Yuan¹, and Soman Abraham³
¹Bucknell University, Lewisburg, PA, ²Duke University, Durham, NC, ³University of Rhode Island, Kingston, RI

Characterization of Particulate and Vapor Phase Nicotine in Electronic Cigarettes
Mark Daley¹, James Baish¹, Darbina Dutcher¹, and Timothy Raymond¹
¹Bucknell University, Lewisburg, PA

Magnetic Control of Multiple Drug Deliveries Using Multi-Compartment Ferrogels
Miranda Mitchell¹, Celia Dunn¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Free Radical Scavenging Potential of Acrylated Polyethylene Glycol Polymers for TBI Treatment
Emily DiMartini¹, Christopher Lowe¹, and David Shreiber²
¹The College of New Jersey, Ewing, NJ, ²Rutgers, The State University of New Jersey, Piscataway, NJ

Acoustic Vaporization of Perfluorocarbon Nanoemulsions
Tristan Ford¹, Satya Kothapalli², Eric Lambert³, Lu Liu¹, Jelena Janjic³, and Hong Chen⁴
¹University of Rochester, Rochester, NY, ²Washington University in St. Louis, St. Louis, MO, ³Duquesne University, Pittsburgh, PA

Addition of Protein Stabilizers to Nanoparticles Derived from Pig Lung Extracellular Matrix
Gabrielle Cotman¹, Patrick Link¹, Robert Poulot¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

Localized FK506 Delivery System for Peripheral Nerve Repair
Susan Wojtalewicz¹, Brett Davis¹, Pratima Labroo², Ching-chen Li³, Jili Shea⁴, Himanshu Sant⁵, Bruce Gale³, and Jay Agarwal⁶
¹University of Utah, Midvale, UT, ²University of Utah, Salt Lake City, UT, ³National Chung Hsing University, Taichung, Taiwan

Novel Micellar Drug Delivery System Using Poly(-amino ester)-Poly(ethylene glycol) Copolymer
James Shamul¹, Yechan Kang¹, Jayoung Kim¹, and Jordan Green¹
¹Johns Hopkins University, Baltimore, MD

Evaluation of Curcumin Loaded Nanoliposomes for the Treatment of Age-Related Macular Degeneration
Sriramya Ayyagari¹, Haris Dar¹, Vivian Morton¹, Kevin Moy¹, Chadni Patel¹, Lalithasi Ramasubramanian¹, Nivetita Ravi¹, Samantha Wood¹, Andrew Zhao¹, Melanie Zheng¹, Kiet Zhou¹, and Jose Helim Aranda Espinoza¹
¹University of Maryland College Park, College Park, MD

Validation of a Galectin-8 Reporter as a Measure of Nanocarrier Endosomal Escape and Biologic Drug Intracellular Bioavailability
Somtochukwu Dimobi¹, Kameron Kilchrist¹, Thomas Werfel¹, and Craig Duvall¹
¹Vanderbilt University, Nashville, TN

High Throughput Droplet Sorting using Surface Acoustic Waves
Elna Davè⁴
¹Harvard University, Cambridge, MA, ²Union College, Schenectady, NY

How Medical Device Regulation Changes Business Practice
Siyu Chen¹, Ben Johnston¹, and Nicholas Lemme¹
¹Brown University, Providence, RI

Industry Analysis of the Largest Medical Device and Pharmaceutical Companies
Sylvia Brown¹
¹Brown University, Providence, RI
Nano and Micro Technologies—Undergraduate

Sat-504
Design of Plasmon Rulers for Study of RNA Splicing
Bara Saadah¹, AbderRahman Sobh¹, Progna Banerjee¹, Zhaleh Ghavami¹, Nahl Sobh¹, and Prashant Jain¹
¹University of Illinois at Urbana-Champaign, Urbana, IL

Sat-505
Characterization of Model Middle Molecular Weight Solute Sieving in the Bioartificial Kidney
Jeff Hsiao¹, Benjamin Feinberg¹, William Fissell², Andrew Zydney³, and Shuvo Roy¹
¹University of California, San Francisco (UCSF), San Francisco, CA, ²Vanderbilt University, Nashville, TN, ³The Pennsylvania State University, University Park, PA

Sat-506
Characterization of Nanoparticle-Membrane Interaction through Cell Membrane Model Platform
Colleen O’Connor¹, Michelle Mansour¹, Eric Freeman ¹, and Xianqiao Wang²
¹The University of Texas at Austin, Austin, TX, ²University of Georgia, Athens, GA

Sat-507
Fabrication and Characterization of a Microwell Array With A Gradient of Well Concavity For Cell-Cell Interaction Studies
Saurin Kantesará¹,², Akash Shah¹, Matthew Disalvo¹,², Yuli Wang¹, Chris Sim¹, and Nancy Albritton¹²
¹University of North Carolina at Chapel Hill, Chapel Hill, NC, ²North Carolina State University, Raleigh, NC

Sat-508
Profile the Effect of Cancer-Associated Fibroblasts on Matrix Alignment and Hydraulic Permeability
Jonathan Chang¹, Alex Avendano¹, Christina Ennis¹, Amanda Stratton¹, and Jonathan Song¹
¹The Ohio State University, Columbus, OH

Sat-509
Modulation of Plant Viral Nanoparticle—Cellular Interactions for Biomedical Applications
Xingjian Gong¹, Yulia Meshcheriakova², George Lomonossoff², Sourabh Shukla¹, and Nicole Steinmetz³⁴
¹Case Western Reserve University, Cleveland, OH, ²Institute of Northern Ireland, United Kingdom, ³Case Comprehensive Cancer Center, Division of General Medical Sciences-Oncology, Cleveland, OH

Sat-510
Transformation of Standard Hygiene Wipe into Biosensor Using Polydiacetylene Nanofibers
John Brennan¹
¹Colorado State University, Fort Collins, CO

Sat-511
Encapsulation of Retinal in Monodisperse Silicone Gel Particles for Programmed Release
Erica Ostal¹,², C. Wyatt Shields IV¹, John White², Nickolas Kirby², Gabriel López², and Stefan Zauscher²
¹Texas State University, San Marcos, TX, ²Duke University, Durham, NC

Sat-512
Enzyme-Carbon Nanomaterial Conjugates in pHEMA-based Hydrogels for Glucose Detection
Andrew Sedler¹,², John Aggas³, and Anthony Guiseppi-Elie¹
¹Texas A&M University, College Station, TX, ²Clemson University, Clemson, SC

Sat-513
Single Walled Carbon Nanotube Fluorescence Detection to Quantify In Vitro Nitric Oxide Concentration
Victoria Bart¹, Eric Hofferber¹, Joseph Stapleton¹, Janelle Adams¹, and Nicole Iverson¹
¹University of Nebraska-Lincoln, Lincoln, NE

Sat-514
Optimization of Mixed Metal Oxide Magnetic Nanoparticles for Point-of-Care Biosensors
Hannah Smith¹, Haley Marks¹, and Gerard Cote¹
¹Texas A&M University, College Station, TX

Sat-515
Characterization of a Microfluidics in vitro Model of the Gastrointestinal Human-Microbe Interface
Amanda Nguyen¹,², Jianing Yang³, Carla Brooks³, and Frederic Zernhautern³
¹Translational Genomics Research Institute, Phoenix, AZ, ²University of Arizona, Chandler, AZ

Sat-516
A Cost-Effective Micro Milling Platform for Rapid Prototyping of Micro Devices
Daniel Yen¹ and Keyue Shen²
¹University of Southern California, Rancho Palos Verdes, CA, ²University of Southern California, Los Angeles, CA

Sat-517
Assessing Uptake of Magnetite Nanoparticles by Fibroblasts Using Transmission Electron Microscopy
Nardine Ghobrial¹, Benjamin Fellows¹, Q. Thompson Mefford¹, and Delphine Deane¹
¹Clemson University, Clemson, SC

Sat-518
Oral Mucosa-on-a-Chip for Cytotoxicity Testing of Biomaterials on Human Gingival Cells
Dominic Padova¹, Christopher Raub¹, Diane Bienek², Gili Kaufman³, and XiaoLong Luo¹
¹Catholic University of America, Washington, DC, ²ADA Foundation, Gaithersburg, MD

Sat-519
Reversible Blood Clotting via pH Controllable Protein Polymers
Jessica Polka¹,², Camilo Ruiz³, Bryan Hsu¹, and Pamela Silver¹
¹Harvard Medical School, Boston, MA, ²Wyss Institute for Biologically Inspired Engineering, Boston, MA

Sat-520
Phase Separating Liposomes For In Vitro Fusion to Membrane Targets
Grant Ashby¹, Zachary Imam², and Jeanne Stachowiak²
¹Georgia Institute of Technology, Atlanta, GA, ²University of Texas at Austin, Austin, TX

Sat-521
Using Computational Modeling for the Design and Optimization of Novel Cancer Theranostics
Binal Brahmbhat¹, Dora Obodo¹, Kaitlyn Scott¹, VedaLakshmi Prasad¹, Brian Schnoor ¹, Carolina Salvador-Morales¹, Juan Cebral¹, Rainald Lohner¹, and Fernando Mut¹
¹George Mason University, Fairfax, VA
Neural Engineering—Undergraduate

Sat–528 Targeting CD14 Pathway on Blood-Derived or Resident Brain Immune Cells Improves Neural Repair
Shusen Lin¹, Hilary Bedell¹,², Madhumitha Ravikumar¹,², Ashley Reins¹, Xujia (Jessica) Li⁴, and Jeffery Capadona²
¹Case Western Reserve University, Cleveland, OH, ²Louis Stokes Cleveland VA Medical Center, Cleveland, OH

Sat–529 Direct Current Stimulation of Endothelial Monolayers Induces a Transient and Reversible Increase in Transport Due to Electro-osmotic Effect
Katherine Arias¹, Lilac Cancel¹, Marom Bikson¹, and John Tarbell¹
¹The City College of New York, New York, NY

Sat–530 Mirror Movements in Chronic Stroke: Origins and Their Influence on Interpretation About Recovery
Bryana Baginski¹, Nicole Varnerin², David Cunningham³, Kelsey Potter-Baker¹, Jesus Cardenas³, Vishwanath Sankarabramanian², and Ela Plo²
¹Clemson University, Clemson, SC, ²Cleveland Clinic, Cleveland, OH

Sat–531 Effects of Phase-Delaying Optogenetic Stimulation of the Suprachiasmatic Nucleus On Mood
Christine Heisler³, Chelsea Vadrine³, Ryan Logan³, and Colleen McClung⁴
³University of Pittsburgh, Pittsburgh, PA, ⁴University of Pittsburgh School of Medicine, Department of Psychiatry, Translational Neuroscience Program, Pittsburgh, PA

Sat–532 The Effect of Nanopatterned Surface on Intracortical Microelectrode Biocompatibility
Cara Smith¹, Seth Mead¹, Keying Chen¹, Jeffrey Capadona¹, and Evon Ereifej¹
¹Case Western Reserve University, Cleveland, OH

Sat–533 Cortical Cell Network Response to Ultrasound Stimulation
Sarah Shaykevich¹, Michael Plaksin², Yonatan Weissler², and Shy Shoham⁵
¹University of Pittsburgh, Pittsburgh, PA, ⁵Technion-Israel Institute of Technology, Haifa, Israel

Sat–534 Generation of Ca²⁺ Networks to Study Intercellular Communication of Human Neural Progenitor Cells
Nicolas Grandel¹, Arun Mahadevan¹, Jacob Robinson¹, and Amina Qutub³
¹Stanford University, Stanford, CA, ³Rice University, Houston, TX

Sat–535 Modeling of Axonal Block Induced by Extracellular Potassium Accumulation in Hippocampal CA1 Region
Amulya Veldanda¹, Daniel Tamashiro¹, and Xuefeng Wei¹
¹The College of New Jersey, Ewing, NJ

Sat–536 Neural Recruitment and Tissue Damage Propensity for Fractal Deep Brain Stimulation Electrodes
Aakhila Rameez¹ and Xuefeng Wei¹
¹The College of New Jersey, Ewing, NJ

Sat–537 Neural Networks and Hand Dominance
Temilade Aladeniyi¹,² and J.C. Mizelle¹
¹East Carolina University, Greenville, NC, ²North Carolina Central University, Durham, NC

Sat–538 Characterization of Electrodes for High-voltage Nanosecond Pulsed Electric Field Exposure of Adrenal Chromaffin Cells
Jordanna Payne¹, Josette Zaklit¹, Hao Li², Robert Terhune³, Indira Chatterjee³, and Gale Craviso³
¹University of Nevada, Reno, Reno, NV

Sat–539 Effect on Rat Motor Behavior of Chronic Intracortical Microelectrodes Implanted in the Motor Cortex
Keith Don¹, Monika Goss¹, Justin McMahon¹, Andrew Shoffstall¹, Evon Ereifej¹, and Jeffery Capadona¹
¹Case Western Reserve University, Cleveland, OH

Sat–540 Photostimulation of Microglia Indicates Cytotoxicity
Yang Lin¹, David Diaz¹, and Abigail Koppes¹
¹Northeastern University, Boston, MA

Sat–541 A Neural Recording Device for Monitoring Preclinical Deep Brain Stimulation Therapy
Anupam Kumar¹, James Fallon², Hugh McDermott², and Joel Villalobos³
¹Bionics Institute, Melbourne, Australia, ²Bionics Institute, East Melbourne, Australia

Sat–542 EEG Dynamics in Epilepsy: From IED Inverse Solution to Microstates
Alexandra Rodriguez Rojas¹
¹Florida International University, Miami, FL

Sat–543 Targeted Effects of FGF-9 Deletion in Scleraxis Lineage Cells
Emily Hudson¹, Michael Sonnenfeld¹, Anna Klintsova¹, and Megan Killian¹
¹University of Delaware, Newark, DE

Orthopaedic and Rehabilitation Engineering—Undergraduate

Sat–544 Polymer Clip Design Affects Migration Resistance and Pressure in Simulated Surgical Conditions
Madeline Simon¹, Hao Li¹, Richard Lebene¹, Kevin Loeppke¹, Zhifeng Lu¹, Connor Darrough¹, Blake Darkow¹, and Carly Garrow¹
¹NanoVA Biomaterials, Inc., Columbia, MO

Sat–545 Growth of Mineral Coatings on Inert Materials Using Electric-Field-Induced Surface Charge
Ian O’Donnell¹, Abdulrahman Alsasa¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Sat–546 Validating an Experimental Dynamic Gait Arena for Measuring Vertical Ground Reaction Forces in Mice
Samantha Haus¹, Emily Lakes¹, Brittany Jacobs¹, and Kyle Allen¹
¹University of Florida, Gainesville, FL

Sat–547 Characterization of Articular Cartilage By Raman Spectroscopy
Kiara Chan¹, Alexander Boys¹, Lawrence Bonassar¹, and Lara Estoff²
¹Cornell University, Ithaca, NY

Sat–548 Effects of Grader Skill Level on Measurement Variability
Joshua Berko¹, Heidi Kloefkorn¹, and Kyle Allen¹
¹University of Florida, Gainesville, FL
Sat–549
Development of Cell Seeded Tissue Engineered Meniscal
Entheses with Functional Solute Gradients
Leanne Iannucci¹, Mary Clare McCorry¹, Tyler Khilnani¹, and
Lawrence Bonassar¹
¹Cornell University, Ithaca, NY

Sat–550
Software Design and Mechanical Verification of An IMU
System To Monitor Cervical Spine Movement
Michelle Riffitts¹, Marcus Allen¹, and Kevin Bell¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–551
The Effect of Environmental Aging on Shore Hardness of
Additive Manufactured Materials for 3D-Printed Custom Foot
Orthotics
Kyle Walker¹, Manav Jain¹, Shannon Hall¹, Lauren Jackson¹,
Breneane Przestrzelski¹, Brian Kalu², Nikki Hooks², Dan Ballard²,
Timothy Pruett¹, Steven Hoefnner¹, and John DesJardins¹
¹Clemson University, Clemson, SC, ²Ability Prosthetics & Orthotics,
Greenville, SC, ³Upstate Pedorthic Services, Greer, SC

Sat–552
Gait Analysis of Vietnamese Amputees Wearing Mercer
Universal Prosthesis versus Customized Prostheses
Brittany White¹ and Cheyenne Andrew¹
¹Mercer University, Macon, GA

Sat–553
Case Studies of Pediatric Poliomyelitis Patients fit with Lower
Extremity Orthotics
Andrew Roy¹
¹Mercer University, Macon, GA

Sat–554
Quantifying the Effect of Varying User Conditions on EMG
Features for Upper-limb Pattern Recognition
Caroline Li¹, Dustin Crouch², and He Huang²
¹Wake Forest University, Winston-Salem, NC,
²UNC/NCSU Joint Department of Biomedical Engineering, Raleigh, NC

Sat–555
Treatment of Poliomyelitis Patient Using Ankle-Foot Orthosis
(AFO) and Analysis of Gait Improvement
Gabriel Gonzalez Quintero¹
¹Mercer University, School of Engineering, Macon, GA

Sat–556
Establishing System to Mimic Hand Acceleration During
Parkinsonian Active Writing Tremors
Sidney Cannon-Bailey¹, Ori Braun Benyamin², and Navit Roth²
¹University of Pittsburgh, Pittsburgh, PA, ²ORT Braude College of
Engineering, Karmi’el, Israel

Sat–557
Developing a Smart Sock to Assist in the Treatment of Plantar
Fasciitis
Jack McGreevey¹, Bryce Kuncele¹, Ryan Gilbert¹, Zachariah Lindower¹,
Alex Giron¹, Omar Abdeladl¹, and Vladimir Reukov¹
¹Clemson University, Clemson, SC

Respiratory Bioengineering—Undergraduate

Sat–558
Linking Cellular Membrane Disruption and Blood-Gas Barrier
Leak in Ventilator-Induced Lung Injury
Chantel Charlebois¹, Gregory Roy¹, Katharine Hamlington¹,
Adelle Julianelle¹, Alyx Cleveland¹, Bradford Smith¹, and Jason Bates¹
¹University of Vermont College of Medicine, Burlington, VT

Sat–559
Design and Testing Of An Automated Bioreactor System to
Maintain Airway Segments Viable for Extended Durations
Under Conditions Mimicking Tidal Breathing
Suzanne Stasiak¹, Daniel Brewster¹, Harikrishnan Parameswaran¹, and
Kenneth Lutchen¹
¹Boston University, Boston, MA

Sat–560
Cellular Endoplasmic Reticulum Stress and Cytokine
Response in Age-Associated Experimental Ventilator
Induced Lung Injury
Franck Kamga Gninizko¹, Michael Valentine¹, Joseph Herbert¹,
Matthew Schnick¹, and Rebecca Heise¹
¹Virginia Commonwealth University, Richmond, VA

Sat–561
Microtubule Dynamics and Exogenous Gene Expression on
Polyacrylamide Gels Of Varying Stiffness
Daniel Bordner¹ and Robert Geiger¹
¹Florida Gulf Coast University, Ft Myers, FL

Sat–562
Bilayer Epithelial/Smooth Muscle Constructs as an In Vitro
Bronchial Model
Peter Sariano¹, Joshua Morgan¹, and Jason Gleghorn¹
¹University of Delaware, Newark, DE

Sat–563
Assessing the Host Inflammatory Response to Acellular Lung
Scaffolds
Joshua Tarantino¹, Clint Skille³, and Bryan Brown³
¹University of Pittsburgh, Mechanicsburg, PA,
²McGowan Institute for Regenerative Medicine, Pittsburgh, PA

Sat–564
Pentagalloyl Glucose Treatment to Mitigate Effects of
Cigarette Smoke Extract in Vitro
Mario F Garcia Duarte¹, Vaideesh Parasaram¹, Jorge I Rodriguez-Devora², and
Naren Vyavahare²
¹University of Texas at El Paso, El Paso, TX,
²Clemson University, Clemson, SC

Stem Cell Engineering—Undergraduate

Sat–565
Influencing Differentiation of Neural Progenitor Cells with
Gene Silencing
Meghan Wyatt¹, William Ong², Wai Hon Chooi², and Sing Yan Chew²
¹University of Pittsburgh, Pittsburgh, PA, ²Nanyang Technological
University, Singapore, Singapore

Sat–566
Regulation of Adenosine A2B Receptor Signaling on
Osteogenic Differentiation of Mesenchymal Stem Cells
Morgan Cobban¹,², Yuru Shih¹, Masayuki Iida¹, and Shyni Varghese³
¹Arizona State University, Tempe, AZ, ²University of California San
Diego, La Jolla, CA

Sat–567
Role for Stiffness in Vascular Fate
Lian Wong¹, Je Chua¹, Drew Glaser¹, and Kara McCloskey¹
¹University of California, Merced, Merced, CA, ²Washington University
in St. Louis, Saint Louis, MO

Sat–568
Differentiation of Mesenchymal Stem Cells into Schwann
Cell-like Phenotype by Electrical Stimulus
Matthew Lentner¹, Metin Uz¹, Suprem Das², Don Sakaguchi²,
Surya Mallapragada², and Jonathan Clausen²
¹Iowa State University, Ham Lake, MN, ²Iowa State University, Ames, IA
Sat–569
Development of Immobilized Bioactive Signals for Pluripotent Stem Cell Differentiation
Alexander Grath¹, Taylor Dorsey¹, and Guohao Dai¹
¹Rensselaer Polytechnic Institute, Troy, NY

Tissue Engineering—Undergraduate

Sat–570
An In Vitro Approach to Identify Skin Sensitizers with Classification Tools
Lingting Shi¹, Talia Greenstein¹, Serom Lee¹, Rene Schloss¹, and Martin Yarmush¹
¹Rutgers University, Piscataway, NJ

Sat–571
Optimization of Electroactive Hydrogel Characteristics for a Composite Skeletal Muscle Scaffold
Caroline Wood¹,²
¹Rutgers, The State University of New Jersey, Piscataway, NJ, ²The College of New Jersey, Ewing, NJ

Sat–572
Optimizing Osteo-Differentiation Factor Delivery Profiles for Enhanced Bone Regeneration
Anne Reisch¹, Seyedeh Zahra Moafi Madani¹, and Stephen Kennedy¹
¹University of Rhode Island, Kingston, RI

Sat–573
Towards Elimination Of The In Vitro Dynamic Culture Period of SVF Cell-Seeded TEVs
Kamil Saleh¹, Darren Haskett³,², Lauren Kokai³,⁴, Justin Weinbaum¹,⁴, Antonio D’Amore¹,⁴,³, William Wagner¹,³,⁵, S. J. Peter Rubin¹,³,⁴, and David Vorp¹,³,⁴,⁵,²
¹University of Pittsburgh, Department of Bioengineering, Pittsburgh, PA, ²University of Pittsburgh, Department of Surgery, Pittsburgh, PA, ³McGowan Institute for Regenerative Medicine, Pittsburgh, PA, ⁴University of Pittsburgh, Department of Plastic Surgery, Pittsburgh, PA, ⁵Center for Vascular Remodeling and Regeneration, Pittsburgh, PA, ²University of Pittsburgh, Department of Cardiothoracic Surgery, Pittsburgh, PA

Sat–574
Utilizing Microfluidics to Recapitulate the Microenvironment of Glioblastoma
Elijah Karvelis¹, Mai Ngo¹, Aidan Gilchrist¹, Roger Kamm², and Brendan Harley¹
¹University of Illinois at Urbana-Champaign, Urbana, IL, ²Massachusetts Institute of Technology, Cambridge, MA

Sat–575
3D Printed Biodegradable Scaffold Loaded with Anti-Inflammatory Cytokines for Local Immunomodulation and Bone Regeneration
Hae Seong Kim¹
¹Columbia University, New York, NY

Sat–576
Engineering The Bone-Cartilage Interface: An Osteochondral Microphysiological System
Kalon Overholt¹, Riccardo Gottardi¹, Alessandro Pirosa¹, and Rocky Tuan¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–577
Development of A Bioreactor Aired At Designing Spatial And Temporal Drug Delivery Profiles For Bone Regeneration Protocols
Inderbir Sondhi¹, Derek Nichols¹, Emily Bayer¹, Riccardo Gottardi¹, and Steven Little¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–578
Centrifugation-based Fabrication of Laminar High-density Tissue Aggregates
Uma Balakrishnan¹, Joseph Shawky¹, and Lance Davidson¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–579
Characterization of Breast Cancer Metastasis using a Two-Dimensional and a Three-Dimensional Assay
Awa Bakayoko¹, Brittany Jenkins², Rupali Hire³, Melissa Davis², and Cheryl Gomillion²
¹University of Maryland, Baltimore County, Silver Spring, MD, ²University of Georgia, Athens, GA

Sat–580
Effects of Hormonal Stimulation on Endometrial Vascular Morphogenesis in 3D PEG Hydrogels
Alyssa Mendenhall¹, Alex Brown¹, Christi Cook¹, and Linda Griffith¹
¹University of Iowa, Iowa City, IA, ²Massachusetts Institute of Technology, Cambridge, MA

Sat–581
Developing a Hydrogel-Loaded Gradient Microarray
Kunal Shah¹, Lauren Cross¹, and Akhilesh Gaharwar¹
¹Texas A&M University, College Station, TX

Sat–582
Characterization of a Microfluidic Platform to Tissue Engineer Arterioles
Hongyi Li¹
¹Washington University in Saint Louis, St. Louis, MO

Sat –583
Real Time Monitoring of Heart Valve Hydrodynamic in Pulse Duplicator
Thanh Le¹, Zeeshan Syedad¹, and Robert Tranquillo¹
¹University of Minnesota Twin Cities, Minneapolis, MN

Sat–584
Assessment of Schwann Cell Migration In Vitro And In Vivo Following Application of a Peripheral Nerve Specific Hydrogel
Mara Palmer¹, Travis Prest¹, and Bryan Brown¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–585
Chitosan Nanoparticle-Loaded Collagen Gels for a Tissue-Engineered Brain Patch
Sakshe Shah¹ and Sarah Anderson¹
¹Harvey Mudd College, Claremont, CA

Sat–586
Analysis of Vascularization Following Implantation of Prevascularized Fibrin Scaffolds in a Cranial Defect Model
Woojin Pang¹, Arianna Roux¹,², Banu Akar¹,², and Eric Brey²,³
¹Illinois Institute of Technology, Chicago, IL, ²Edward Hines Jr. VA Hospital, Hines, IL

Sat–587
Effect of HIF1 Activity on CD44 Variant Expression And Matrix Production During Chondrogenic Differentiation Of Human Mesenchymal Stem Cells
Emily Durisin¹, Rhima Coleman¹, and Biming Wu¹
¹University of Michigan, Ann Arbor, MI

Sat–588
Analysis of Extracellular Matrix in Mice with Muscular Dystrophy and its Effect on Myoblast Function
Felicia Sadikin¹, Ashley Kaminski-Earle¹, and Jan Lammerding¹
¹Cornell University, Ithaca, NY

Sat–589
Electrospinning: Creating 3D Biocompatible Scaffolds
Victoria Myers¹ and Barbara Muller-Borer⁹
¹East Carolina University, Linden, NC, ²East Carolina University, Greenville, NC
Saturday, October 7 | 9:30 am–1:00 pm | Poster Session | Exhibit Hall BC

**Poster Viewing with Authors & Refreshment Break | 9:30 am–10:15 am**

**Sat–590**
**In Vitro Characterization and In Vivo Survival of Three-Dimensional Vascular Networks in Fibrin Scaffolds**
Beatriz Barrera¹, Brianna Rouxi², Banu Akar¹, and Eric Brey³
¹Illinois Institute Of Technology, Chicago, IL, ²Edward Hines Jr. VA Hospital, Hines, IL

**Sat–591**
**In Vitro Development of a Vascularized Full Thickness Skin Equivalent Model**
Andrew Ramos¹,², Maryna Pavolva¹, Anna Jakimenko¹, and Ganna Bilousova¹
¹University of Colorado, Anschutz Medical Campus, Aurora, CO, ²Charles, C Gates Center of Regenerative Medicine, Aurora, CO

**Sat–592**
**Lyophilized Platelet-Rich Plasma Increases Osteoblast Proliferation and Alkaline Phosphatase Activity**
Rachel Rone¹, Scott Sell¹, and Natasha Case¹
¹Saint Louis University, Saint Louis, MO

**Sat–593**
**Extracellular Matrix Mediation of Adipose Tissue Differentiation and Function**
Christopher Mayhugh¹, Feipeng Yang¹, Ronald Cohen², and Eric Brey³
¹Illinois Institute of Technology, Chicago, IL, ²The University of Chicago, Chicago, IL

**Sat–594**
**Cellular Response to Spider Silk Scaffolds**
Dallas Montag¹, Katherine Hafner¹, Marian Kennedy², and Delphine Deane²
¹Marietta College, Marietta, OH, ²Clemson University, Clemson, SC

**Sat–595**
**The Development of a Novel PPLG Hydrogel System to Promote the Vascularization of iPSC-Derived Endothelial Cells**
Kwasi Amofa¹, Hongkun He², Alex Wang³, Marianna Sofman³, Linda Griffith³, and Paula Hammond²
¹Western New England University, Springfield, MA, ²Massachusetts Institute of Technology, Boston, MA

**Sat–596**
**Approaches to Antigen Removal from a Porcine Osteochondral Xenograft**
Ruth Recinos¹, Emily Wright¹, and Steven Elder¹
¹Mississippi State University, Starkville, MS

**Sat–597**
**Analysis of Structure and Strength of Tissue Rings Fabricated in Custom Machined Culture Wells**
Kathy Suqi¹, Hannah Strobel¹, Christopher Nycz¹, Gregory Fischer¹, and Rolle Marsha¹
¹Worcester Polytechnic Institute, Worcester, MA

**Sat–598**
**Vacuum-assisted Recellularization of Decellularized Porcine Mitral Valve Scaffold**
Brianna Sanchez¹, Christopher deBorde², Line Sierad³, Jorge I Rodriguez-Devora², and Aggie Simionescu²
¹University of Texas at El Paso, El Paso, TX, ²Clemson University, Clemson, SC

**Sat–599**
**Additive Manufacturing to Produce Mechanically Anisotropic Hydrogels for Cardiac Tissue Engineering**
Yasmeen Rose¹, Leanne Horvath¹, Ken Tichauer¹, Shaoxian Hu¹, Emily Dosmar¹, Wenqiang Liu¹, Jennifer Kang-Mieler¹, and William Mieler¹
¹Illinois Institute of Technology, Chicago, IL

**Sat–600**
**Epithelial Wound Closing in Engineered Microtissues**
Jaclyn Grode¹, Mahmut Sakar², Christopher Chen³, and Jeroen Eyckmans³,²
¹Boston University, Boston, MA, ²Institute of Mechanical Engineering, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland, ³Wyss Institute for Biologically Inspired Engineering, Harvard University, Boston, MA

**Sat–601**
**Comparison of Polysulfone and Collagen Substrates as a Membrane for the Growth of Murine Myoblast Cell Culture**
Katherine Glattelli¹, Lori Caldwell¹, Annelise Dykes¹, Charles Harding¹, David Britt¹, and Elizabeth Vargis¹
¹Utah State University, Logan, UT

**Sat–602**
**Mechanics of Collagen Gels vs. Collagen-Hyaluronic Acid Co-Gels in Confined Compression.**
Scottland Adkins¹
¹University of Minnesota-Twin Cities, Lake Elmo, MN

**Translational Biomedical Engineering—Undergraduate**

**Sat–373**
**Engineering Dermal Therapeutics**
Madelyn O’Gorman¹, Stella Martono¹, MaKayla Serres², Victoria Be-dell¹, Alexander Meves³, Luke Hoeppner³, Debabrata Mukhopadhyay¹, and Stephen Ekker¹
¹University of Puerto Rico-Mayaguez Campus, Moca, PR, ²University of Minnesota, Minneapolis, MN, ³Medtronic Inc., Minneapolis, MN

**Sat–374**
**Microenvironment Stiffness as a Phagocytic Control Mechanism of “Self” Signaling by Macrophages**
Rachel Coler¹, Cory Alvey¹, and Dennis Discher¹
¹University of Pennsylvania, Philadelphia, PA

**Sat–375**
**Method for the Determination of Adipose Distribution on the Epicardial Surface of Human Hearts**
Mario Soto¹,², Alexander Mattson³, and Paul Iaizzo³
¹University of Minnesota-Twin Cities, Lake Elmo, MN, ²University of Minnesota, Minneapolis, MN

**Sat–376**
**A Novel Biomarker for Early Diagnosis of Diabetic Retinopathy Through Analysis of Clinically Relevant Fluorescein Videoangiography Data**
Miranda Poklar¹, Leanne Horvath¹, Ken Tichauer¹, Shaoxian Hu¹, Emily Dosmar¹, Wenqiang Liu¹, Jennifer Kang-Mieler¹, and William Mieler¹
¹Illinois Institute of Technology, Chicago, IL

**Sat–377**
**Early Detection of Diabetic Retinopathy using a Non-invasive Measure of Retinal Vascular Permeability**
Leanne Horvath¹, Miranda Poklar¹, Shaoxian Hu¹, Emily Dosmar¹, Wenqiang Liu¹, William Mieler¹, Jennifer Kang-Mieler¹, and Kenneth Tichauer¹
¹Illinois Institute of Technology, Chicago, IL, ²University of Illinois at Chicago, Chicago, IL

**Sat–378**
**Methicillin-Resistant Staphylococcus Aureus Inhibited by Photodynamic Antimicrobial Therapy**
Anna Martinez¹,², Nicholas Nolan³, Heather Durkee², Alejandro Arboleda², Nidhi Batra³, Mariela Aguilar³, Cornéil Rowan², Alex Gonzalez², Guillermo Amescua², Harry Flynn², Darlene Miller², and Jean-Marie Parel²
¹University of Minnesota-Twin Cities, Lake Elmo, MN, ²University of Minnesota, Minneapolis, MN, ³Hormel Institute, Austin, MN

**Sat–379**
**Design and Construction of a Virtual Bioamplification Machine**
Parker Schibel¹, Kevin Jones¹, and Olivia Coiado¹
¹University of Portland, Portland, OR
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| **Sat–380** | Nitrile Oxide Releasing Biodegradable Polymers for Medical Applications  
Nette Brown¹, Priya Singha¹, Jennifer McCarty¹, Hitesh Handa¹, and Jaason Locklin¹  
¹University of Georgia, Athens, GA |
| **Sat–381** | Development of Lifelike Training Device for Simulated Radial Artery Catheterization  
Mark Doose¹  
¹University of Illinois at Urbana Champaign, Urbana, IL |
| **Sat–382** | The Effect of Red Blood Cell Morphology on Cellular Membrane Stiffness  
Samuel Boland³, Carey Bomack¹, Siu Ling Leung¹, and Peter Butler¹  
¹The Pennsylvania State University, University Park, PA, ²University of Memphis, Memphis, TN |
| **Sat–383** | Quantification of Nanoparticles in the Systemic Circulation After Intracranial Administration by Convection-Enhanced Delivery  
Christina Huang¹, Jenna DiRito¹, Alice Gaudin¹, Gregory Tietjen¹, and Mark Saltzman¹  
¹Yale University, New Haven, CT |
| **Sat–384** | The Advantage of Hospital-University Partnerships for Introducing New Devices into the Healthcare System  
Michelle Archambault¹, Addison Haxo¹, Kaitlin Mowery¹, Henry Stann¹, S. Mark Poler¹, Daniel Cavanagh¹, and Eric Kennedy¹  
¹Bucknell University, Lewisburg, PA, ²Geisinger, Danville, PA |
| **Sat–385** | Detection of Nanoscale ATP-dependent Membrane Mechanics Using a Modified Optical Trap  
Carey Bomack¹, Samuel Boland³, Siu Liu Leung¹, and Peter Butler¹  
¹The University of Memphis, Memphis, TN, ²The Pennsylvania State University, State College, PA |
| **Sat–386** | Effect of AOT Concentration on Gelatin Nanoparticle Diameter  
Akinede Davies¹, Justin Dinenberg², James Croyne¹, and Yong Wang³  
¹Carnegie Mellon University, Long Beach, CA, ²Penn State University, Philadelphia, PA, ³Penn State University, State College, PA |
| **Sat–387** | iPSC-generated HSPCs Exhibit Critical Integrons and In-Vivo-like Cell Sprouting  
Michael Drakoupolou¹,², Luigi Alvarado², Ishan Asokan²,³, Christian Combs³, and Andre Larochele³  
¹Purdue University, West Lafayette, IN, ²National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD, ³Vanderbilt University School of Medicine, Nashville, TN, ⁴National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD |
| **Sat–388** | Advancing Capstone Projects Beyond the First Generation: An Emergency Rapid Injection Device  
Pamela Johnson¹, Rebecca Osborne¹, Fatima Rezaei¹, Katherine Solley¹, Kevin Grimm¹, Eric Kennedy¹, and Daniel Cavanagh¹  
¹Bucknell University, Lewisburg, PA, ²Geisinger Health System, Danville, PA |
| **Sat–389** | Multifunctional Hyaluronic Acid Dressings with Antimicrobial Properties for Chronic Wound Healing  
Lindsay Lozeau¹, Dalia Shendi¹, Alicia Aquino¹, Anjana Jain¹, and Terri Carnesano¹  
¹Worcester Polytechnic Institute, Worcester, MA |
| **Sat–390** | Design and Experimental Evaluation of an Improved Breast Milk Delivery Device for Premature Neonates  
Guiselle Esquivel¹, Jorge Lizano¹, Johanna Madrigal¹, and Eric Richardson²  
¹Instituto Tecnologico de Costa Rica, Cartago, Costa Rica, ²University of Kansas, Kansas City, KS |
| **Sat–391** | Characterizing a Peripheral-Simulating Bioreactor Bench-top Model  
Carson Schaff¹, Samaa Yazdani¹, John Faulk¹, and Jesús Estaba¹  
¹University of South Alabama, Mobile, AL |
| **Sat–392** | Laminar Profile Underlying the Propagation of CSD: From Single Neurons to Population Activity  
Daniel Rivera¹, Darlene Ramos¹, Sarahy Garcia¹, Yisel Frometa¹, Yoichiro Mori², and Jorge Riera¹  
¹Florida International University, Miami, FL, ²University of Minnesota, Minneapolis, MN |
| **Sat–393** | Osseointegration Correlates with Peri-prosthetic Bone Mass in Compromised Murine Bone  
Arvinth Sethuraman¹, Xu Yang¹, Benjamin Ricciardi¹, Aleksey Dvorzhinskiy¹, Yuo-yu Lee¹, Joseph Koressel¹, Joseph Choi¹, Zachary Lane¹, Kevin Nishida¹, Matthew Shirley¹, Zhiwei Wang¹, Marjolein van der Meulen¹,², and Mathias Bostrom¹  
¹Hospital for Special Surgery, New York, NY, ²Cornell University, Ithaca, NY |
| **Sat–394** | An In Vitro Inverted Vertical Invasion Assay to Avoid Manipulation of Rare or Sensitive Cell Types  
Tanner McCardle¹, Brenda Ogle¹, and Felicite Noubissi¹,²  
¹University of Minnesota, Minneapolis, MN, ²Jackson State University, Jackson, MS |
| **Sat–395** | A Novel Liposomal Formulation Targeting Candida albicans  
Sarah Cowles¹, Noel Vera-Gonzalez¹, Christina Bailey¹, and Anita Shukla¹  
¹Brown University, Providence, RI |
| **Sat–396** | Contractile Dysfunction and VF During Sodium-Calcium Exchanger Inhibition in Hearts from TAC Rats  
Mary Kate Dwyer¹, Sarah Kuzmiak-Glancy¹, Kara Garrott¹, and Matthew Kay¹  
¹The George Washington University, Washington, DC |
| **Sat–397** | The Use of iPSC-Derived Endothelial Cells in Organ-on-a-Chip Applications  
Rose Yin¹, Yosuke Kurokawa¹, Michael Shang¹, and Steven C. George¹  
¹Washington University in St. Louis, St. Louis, MO |
Sat-398  
Silk Hydrogel Microfluidics Using 3D Printed Pluronic Sacrificial Elements  
Shivaali Maddali¹, Thomas Valentin¹, and Ian Wong¹  
¹Brown University, Providence, RI

Sat-399  
Synergistically Inducing Neural Differentiation via 3D Printed Aligned Structure and Bio-inspired Immobilization of Growth Factors  
Fahed Masood¹, Wei Zhu², and Lijie Grace Zhang³  
¹University of Maryland, College Park, Silver Spring, MD, ²The George Washington University, Washington, DC, ³The George Washington University, Washington D.C., DC

Sat-400  
A Glucose Dehydrogenase Based Electrochemical Biosensor for Detection of Glucose in Human Saliva  
Alaina Jenish¹, Chi Lin¹, Brenna Pratt¹, Annah Alkhan¹, Susan Sheffield¹, Jonus Reyna¹, Cael Muggeridge¹, and Jeffrey LaBelle¹  
¹Arizona State University, Tempe, AZ

Sat-401  
Role of Nanoparticles’ Mechanical Stiffness in Cellular Uptake  
Emily Lindberg¹, Jin Xie², Liuyang Zhang³, Shiyi Zhou², and Xianqiao Wang²  
¹Syracuse University, Syracuse, NY, ²University of Georgia, Athens, GA

Sat-402  
Software for 3D Quantitative Analysis of the Eye Vasculature  
Felipe Suntaxi¹, Ning-Jun Jan¹, Andrew Voorhees¹, Konstantinos Verdelis¹, and Ian A. Sigal¹  
¹University of Pittsburgh, Pittsburgh, PA

Sat-403  
Preventing Infection in Silicone Based Medical Devices Using Nitric Oxide Release  
Kaylee O’Connor¹, Marcus Goudie², Priyadarshini Singh², Jennifer McCarty³, and Hitesh Handa³  
¹University of Alabama, Tuscaloosa, AL, ²University of Georgia, Athens, GA

Sat-404  
Replicating Trabecular Meshwork Cellularity Changes in Glaucoma: A Modified in vitro Model  
Richard Vannatta¹, Ross Ethier¹, and Eric Snider¹  
¹Georgia Institute of Technology, Atlanta, GA

Sat-405  
Modeling and Experimental Analysis of the Temporary, Fully-Retreivable Stent for Traumatic Hemorrhage Control  
Mark Littlefield¹, Yanfei Chen¹, Bryan Tillman², Sung Kwon Cho³, and Youngae Chun¹  
¹University of Pittsburgh, Pittsburgh, PA, ²University of Pittsburgh Medical Center, Pittsburgh, PA

Sat-406  
Dual Fiber Bragg Gratings Embedded Catheter for Temperature Insensitive Contact Force Sensing in Electrophysiology Therapy  
Leah Feuerman¹, Li Xu², Zion Tse², and Mable Fok²  
¹Occidental College, Los Angeles, CA, ²University of Georgia, Athens, GA

Sat-407  
MIP-1α Up-Regulates Mesothelial Expression of P-selectin to Increase Ovarian Cancer Cell Adhesion  
Anne-Sophie Mancha¹, Molly J. Carroll², and Pamela K. Kreeger²  
¹Fort Lewis College, Durango, CO, ²University of Wisconsin-Madison, Madison, WI

Sat-408  
Thallium Detection Using Paper-Based Cell-Free Sensor Circuitry  
Maya Lemmon-Kishi¹, Venkata Peddada¹, Claire Chu¹, Maddie Perdoncin¹, Aife Ni Chochlain¹, Lisa Antoszewska², Jason Lohmueller¹, Natasa Miskov-Zivanov³, Cheryl Telimer³, Sanjeev Shroff³, and Alex Deiters³  
¹University of Pittsburgh, Pittsburgh, PA, ²Carnegie Mellon University, Pittsburgh, PA

Sat-409  
Using Texture Analysis to Characterize a Pediatric Brain Tumor Model  
Kathleen Francis¹, Tien Tang¹, and M. Waleed Gaber²  
¹Rice University, Houston, TX, ²Texas Children’s Hospital, Houston, TX

Sat-410  
Differential Gene Expression of ECM Proteins and Adhesion Molecules In Tailored Polycrylamide Gels  
Zachary Weisshampel¹, Dalton Berrie¹, Andria Doty¹, and Sarah Glover¹  
¹University of Florida, Gainesville, FL

Sat-411  
The effect of Hydrostatic Pressure on Neuronal Cell Morphology In Vitro the Effect of Hydrostatic Pressure on Neuronal Cell Morphology In Vitro  
Kallie Etten¹, Jiro Nagatomi¹, and Curtis Harper¹  
¹Clemson University, Clemson, SC

Sat-412  
Axlotl Retinal ECM Promotes Down-regulation of ERK 1/2 Expression in Human Retinal Progenitor Cells.  
Aanie Phillips¹, Joydip Kundu¹, and Rebecca Carrier¹  
¹Northeastern University, Boston, MA

Sat-413  
Effects of Low Dose Radiation and Tetanus Toxoid on the Strength of Bone  
Philip Binaco¹, Steve Ayala¹, Danielle Howe¹, Michael Pecaut¹, Nina Nishiyama¹, Xiao Mao², Denise Rodriguez², Andy Kwok³, Ted Bateman³, Stephen Chapess³, Jeffrey Willey³, and Anthony Lau¹  
¹The College of New Jersey, Ewing, NJ, ²Loma Linda University Department of Basic Sciences, Loma Linda, CA, ³Loma Linda University School of Medicine Loma Linda, Loma Linda, CA, ⁴Wake Forest School of Medicine, Winston-Salem, NC, ⁵University of North Carolina Chapel Hill, Chapel Hill, NC, ⁶Kansas State University, Manhattan, KS

Sat-414  
Creating a Scalable Tibia Model to Predict Tibial Stresses  
Julie Liu¹, Karleen Bartol¹, Leela Goel¹, John Willson¹, and Stacey Meardon¹  
¹East Carolina University, Greenville, NC

Sat-415  
Development of a PNA-Based Microfluidic Assay for the Detection and Quantification of HIV  
Alden Moss¹, Kaylyn Oshaben¹, Daniel Appella¹, Nicole Morgan², and Thomas Pohida²  
¹Oregon State University, Corvallis, OR, ²National Institutes of Health, Bethesda, MD

Sat-416  
Title: Estimation of the Viscous Properties of Skin and Subcutaneous Tissues with an Image-based Method  
Ingram Jansen¹ and Jason Yao²  
¹East Carolina University, Fayetteville, NC, ²East Carolina University, Winterville, NC

Sat-417  
Investigating the Role of Exosomes in Mesenchymal Stem Cell-Based Immunomodulation  
Mariko Kanai¹, Holly Wobma¹, Bohao Liu¹, and Gordana Vunjak-Novakovic¹  
¹Columbia University, New York, NY
Sat–418
Flexible Biosensor to Monitor Ion Concentrations Via Sweat Analysis
Christopher Rumrill¹, Qiwei Wang¹, and Hyeun Joong Yoon¹
¹South Dakota State University, Brookings, SD

Sat–419
Rapid Decrease in The Cortical Bone Mineral Density in Response to The Intake Of Cocaine
Brandon Zhuang¹, Amna Haider¹, Hyunsu Shin², Kevin Clare¹, Craig P. Allen¹, Gabriel Pagnotti¹, Congwu Du¹, Clinton T. Rubin¹, and M. Ete Chan²
¹Stony Brook University, Stony Brook, NY, ²Half Hollow Hills High School East, Stony Brook, NY, ³Stony Brook University, Stony Brook, NY

Sat–420
The Effects of Modulated Glucocorticoid Receptors on Lipopolysaccharide Mediated Inflammation
Ioana Soaita¹, Irina Hutson², Kevin Bauerle², and Charles Harris²
¹Stony Brook University, Stony Brook, NY, ²Washington University in St. Louis School of Medicine, St. Louis, MO

Sat–421
Vimentin Affects Formation of Cellular Protrusions in hMSCs with SDF-1 During Transwell Migration
Tejasvi Peesay¹, Carlos Luna¹, Poonam Sharma¹, and Adam Hsieh¹
¹University of Maryland, College Park, MD

Sat–422
Association of Negative Symptoms of Schizophrenia with Fear Network Dysregulation
Philip Dmitriev¹, Megan Quarmley¹, Daniel Wolf¹, Ruud Dings², and Robert Gorman²
¹The University of Texas at Austin, Austin, TX, ²The University of Pennsylvania, Philadelphia, PA

Sat–423
Fetal Development of the Bovine Anterior Mitral Valve Leaflet
Robert Laureijis¹ and Sarah Wells¹
¹Dalhousie University, Halifax, NS, Canada

Sat–424
Quantitative Diffuse Optical Spectroscopy of Radiation Therapy Resistance in Tumors
Paola Monterroso Diaz¹, Kinan Alhallak¹, Dakory Lee¹, Ruud Dings², and Narasimhan Rajaram¹
¹University of Arkansas, Fayetteville, AR, ²University of Arkansas for Medical Sciences, Little Rock, AR

Sat–425
MR-Based Wall Shear Stress Calculation in Pulmonary Hypertension
Jennifer Rickens¹ and Stephanie George²
¹Thiel College, Greenville, PA, ²East Carolina University, Greenville, NC

Sat–426
VEGFR1 Signaling Induced by VEGFA Stimulation
Nicole Grubb¹,², Jared Weddell³, and P.I. Imoukhuede⁴
¹Florida State University, Tallahassee, FL, ²University of Illinois Urbana-Champaign, Urbana, IL, ³Duke University, Durham, NC

Sat–427
A Low-Cost Device for Quantifying Tissue Stiffness with Ultrasound
Bowen Shaner¹, Kristy Walsh¹, Mark Palmeri², and Brett Byram¹
¹Vanderbilt University, Nashville, TN, ²Duke University, Durham, NC

Sat–428
Multi-Scale Modeling of T Cell and Antigen Presenting Cell Interaction in the Tumor Microenvironment
Jose Perez¹, Meghan Bloom¹, and Marcelo Behar²
¹The University of Texas at El Paso, El Paso, TX, ²The University of Texas at Austin, Austin, TX

Sat–429
Assessment of Medical Equipment in Kisarawe, Tanzania
Casey Young¹, Ian DeMass¹, Carson Brewer¹, Ryan Gilbert¹, Kyle Guion¹, Melissa McCullough¹, John DesJardins¹, and Delphine Dean¹
¹Clemson University, Clemson, SC

Sat–430
Towards Developing a Convenient Tripping Testing Procedure
Vibhavari Vempala¹
¹University of North Carolina at Chapel Hill and North Carolina State University, Raleigh, NC

Sat–431
Ariel Cross¹, Cortes Williams¹, and Vassilios Sikavitsas¹
¹University of Oklahoma, Norman, OK

Sat–432
Characterizing Infarcted Myocardium Ultrastructure using Electron Microscopy
Elizabeth Shih¹, Ethan Kwan¹, Salma Ayoub¹, David Li¹, Michael Sacks¹, Joseph Gorman III², and Robert Gorman²
¹The University of Texas at Austin, Austin, TX, ²The University of Pennsylvania, Philadelphia, PA

Sat–433
Examining Effects of PEG Length and Silica Nanoparticle Size On Cell Viability
Kyle Paul¹, Alexander Kelly¹, and Allan David¹
¹Auburn University, Auburn, AL

Sat–434
The Effect of SOD Conjugates on the Release Of Free Radicals by Inflammatory Cells
Jeannette Rodriguez¹, Dmitry Gil¹, and Vladimir Reukov¹
¹Clemson University, Clemson, SC

Sat–435
Circulating MicroRNA in Blood Serum as Promising Biomarkers for Treatment Progression against Colorectal Cancer
Nrobi Celestine¹, Will Goth², and James Tunnell²
¹Milwaukee School of Engineering, Milwaukee, WI, ²The University of Texas at Austin, Austin, TX

Sat–436
Development of Two-Photon Calcium Imaging Methods for Circuit Mapping In Mouse Motor Cortex
Dillon Thomas¹, Bryan Hooks¹, Brett Saltrick¹, and Sandra Okoro¹
¹University of Pittsburgh, Pittsburgh, PA

Sat–437
Spatial Frequency Domain Imaging of Tissue Phantom Models of Tumor Margins
Nrobi Celestine¹, Will Goth², and James Tunnell²
¹Milwaukee School of Engineering, Milwaukee, WI, ²The University of Texas at Austin, Austin, TX
Sat-438  
**Synthesis Of Fe3O4 Nanoparticles and Quantification Of Nanoparticle Uptake In U87MG-EGFP Glioma Cells And Primary Astrocytes.**  
Lauren Mehanna¹, Meghan Logun², Wujun Zhao², Leidong Mao², and Lohitash Karumbaiah²  
¹University of Kentucky, Lexington, KY, ²University of Georgia, Athens, GA

Sat-439  
**Breast Cancer Paracrine Signals Alter Osteocyte Phenotype in a 3D Bone Scaffold**  
Jeremy Keys¹, Mary Hagen¹, Blayne Sarazin¹, and Maureen Lynch¹  
¹University of Massachusetts Amherst, Amherst, MA

Sat-440  
**Cumulative Head Impact Exposure On Offseason DTI and DKI Changes In Youth Football Athletes**  
Jordan Scott¹,², Elizabeth Davenport³, Jillian Urban², Joel Sitzel³, Joseph Maldjian³, and Christopher Whitlow³  
¹University of Michigan, Ann Arbor, MI, ²Virginia Tech-Wake Forest University Center for Injury Biomechanics, Winston-Salem, NC, ³University of Texas Southwestern, Dallas, TX

Sat-441  
**Effects of Orbital Shear Stress on Exogenous Gene Expression**  
Morghan Alters¹, Shane Noble¹, Daniel Bordner¹, and R.Christopher Geiger¹  
¹Florida Gulf Coast University, Fort Myers, FL

Sat-442  
**The Effect of Hydrogel Degradation Mechanism on Encapsulated Submandibular Gland Cells**  
Brittany Schutrum¹, Andrew Shubin¹, Catherine Ovitt¹, and Danielle Benoit¹  
¹University of Rochester, Rochester, NY

Sat-443  
**The Use of Microfluidics to Compare the Dynamic Behavior of Microtubule Plus and Minus Ends**  
Nikita Thomas¹ and Marija Zanic¹  
¹Vanderbilt University, Nashville, TN

Sat-444  
**Effect of Chemically Induced Locomotion and Enzyme Activity on Janus Particle Conjugate**  
Dev Mandavia¹, Andrew Pan¹, and Rick Saha¹  
¹Georgia Institute of Technology, Atlanta, GA

Sat-445  
**Pain Away with RA - Handheld Device for Improving Hand Pain and Stiffness in Patients with Rheumatoid Arthritis**  
Kelli Lynch¹  
¹Northeastern University, Boston, MA

Sat-446  
**Effects of Space-flight Head-ward Fluid Shifts on Neurocognitive Abilities and Cerebral Blood Flow**  
Robert Hazel¹  
¹University of North Carolina at Chapel Hill, Chapel Hill, NC

Sat-447  
**TNF- and VEGF Modulate Oligomerization of Amyloid Beta By Neurovascular Cells**  
Andrew Hong¹  
¹Georgia Institute of Technology, Atlanta, GA

Sat-448  
**Bodies in Motion: Biomechanical Data Acquisition with a Skeleton Tracking Sensor**  
Bruce Coluccio¹, M. Ete Chan¹, Richard Mckenna¹, Zhengyang Liu¹, Amna Haider¹, Gabriel Pagnotti¹, and Clinton Rubin¹  
¹Stony Brook University, Stony Brook, NY

Sat-449  
**Bead-based IL-6 Immunoassay on a Chip**  
Damian Hernandez¹  
¹Illinois Institute of Technology, Chicago, IL

Sat-450  
**Bone Marrow Mesenchymal Stem Cell Derived Exosomes Attenuate Ischemia Induced Retinal Injury**  
Sara Mohamed¹, Biji Mathew¹, Leianne Torres¹, Jasmine lopez¹, Samantha Keil¹, Clara stelman¹, Andrew Schwartz¹, and Steven Roth¹  
¹University of Illinois at Chicago, Chicago, IL
## Program At-A-Glance | Thursday | October 6, 2016

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<td>Metabolic Models Room 200D</td>
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<td>Systems Approaches to Therapy, Therapeutics and Precision Medicine Room 200D</td>
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<td><strong>BIOMECHANICS</strong></td>
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<td>The Nucleus and Cytoskeleton in Mechanobiology Auditorium 1</td>
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<td>Implant and Prosthetic Biomechanics Room 101C</td>
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<td><strong>BIOENGINEERING EDUCATION</strong></td>
<td>Global Health Engineering 2.0: Building Educational Capacity in Africa Room 200G</td>
<td>Imaging Techniques in Tissue Engineering Room 200C</td>
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<td><strong>BIOIMAGING &amp; OPTICS</strong></td>
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<td><strong>CANCER TECHNOLOGIES</strong></td>
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<td>Imaging Strategies and Molecular Profiling in Cancer Auditorium 2</td>
<td>Cancer Immunotechnology Auditorium 2</td>
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<td>Engineered Models of Breast Cancer Metastasis and the Tumor Environment Room 101B</td>
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<td><strong>CARDIOVASCULAR ENGINEERING</strong></td>
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<td>Cardiovascular Devices I Room 101B</td>
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<td>Molecular and Cellular ImmuneEngineering Room 101A</td>
<td>Molecular and Cellular Engineering Functional Materials and Sensors Room 101A</td>
<td>Single Cell and Collective Migration Room 101A</td>
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<td>Micro/Nano Tools in Molecular Biology (Genomics, Proteomics) Room 101B</td>
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<td><strong>DEVICE TECHNOLOGIES AND BIOENGINEERING</strong></td>
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<td>Novel Materials and Self Assembly for Drug Delivery Room 200H</td>
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<td>Biosensors Room 200F</td>
<td>Affordable Health Devices and Frugal Innovation Room 200F</td>
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<td><strong>DRUG DELIVERY</strong></td>
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<td>Drug Delivery in Tissue Engineering and Medicine Room 200H</td>
<td>Microfluidics for the Diagnostic and Monitoring of Viral Infections Room 200G</td>
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<td><strong>NANO AND MICRO TECHNOLOGIES</strong></td>
<td>Micro/Nano Tools in Molecular Biology (Genomics, Proteomics) Room 101B</td>
<td>Micro/Nano Tools for Monitoring Inflammation Room 200G</td>
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<td>Micro/Nano Tools in Neurosciences Room 200J</td>
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<td>NEURAL ENGINEERING</td>
<td>Micro/Nano Tools in Neurosciences Room 200U</td>
<td>Spinal Cord Tissue Engineering &amp; Repair Room 200U</td>
<td>Peripheral Nerve Stimulation and Repair Room 200U</td>
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<td>ORTHOPEDIC AND REHABILITATION ENGINEERING</td>
<td>Musculoskeletal Tissue Engineering I Room 102C Orthopedic Mechanobiology and Mechanotransduction Room 101C</td>
<td>Musculoskeletal Tissue Engineering II Room 102C Naturally-Derived and Extracellular Matrix Biomaterials and Tissue Engineering Room 102AB Implant and Prosthetic Biomechanics Room 101C Articular Cartilage and Joints Room 200B</td>
<td>Intervertebral Disc and Spine Room 200B</td>
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<td>RESPIRATORY BIOENGINEERING</td>
<td>Computational Modeling of the Respiratory System in Health and Disease Room 200I</td>
<td>Computational Mechanics of the Respiratory System Room 200I</td>
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<td>STEM CELL ENGINEERING</td>
<td>Directing Stem Cell Differentiation I Room 101D</td>
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<td>TRANSLATIONAL BIOMEDICAL ENGINEERING</td>
<td>Translation of Biomedical Products Room 200G</td>
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<td>OTHER</td>
<td>9:00 am–10:00 am INDUSTRY SESSIONS:</td>
<td>1:00pm–2:30pm Meet the Expert: NIH Funding: Meet Program Directors, Reviewers and Awardees Room 204</td>
<td>3:15 pm–4:45 pm Engineering Low-Cost Solutions to Address Health Care Disparities Room 208CD</td>
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<td>12:00 noon–2:00 pm Intellectual Property: Patent Process Technology Transfer Pitches and Networking Room 201</td>
<td>1:00pm–2:30pm International Symposium on Biomedical Engineering Room 208CD</td>
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<td>1:00pm–4:00pm Developing Best Practices for Graduate Training in Biomedical Innovation Room 102E</td>
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<td>2:15pm–5:00pm INDUSTRY SESSION: Special Industry Topics Room 201</td>
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<td>STUDENT AND EARLY CAREER</td>
<td>8:00 am–9:00 am Becoming a Biomedical Engineer... What you need to know and where do you fit in Room 205 9:15 am–10:15 am BME Careers in Academia Room 205</td>
<td>1:30 pm–2:45pm BME Careers in Industry Room 205</td>
<td>2:45pm–4:15pm Rapid Resume Review–Members Only Room 208CD</td>
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<td>3:15 pm–4:30 pm BME Government and Alternative Careers Room 205</td>
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<td>BIOINFORMATICS</td>
<td>8:00 am-9:30 am</td>
<td>Theory and Practice of Synthetic Biology Room 101A</td>
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<td>Computational and Multiscale Modeling in Biomechanics I Room 200C</td>
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<td>1:45 pm-3:15 pm</td>
<td>Single-Cell Measurements and Models Room 200D</td>
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<td>Computational and Multiscale Modeling in Biomechanics II Room 200C</td>
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<td>BIOMATERIALS</td>
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<td>Biomaterials for Immunomechanics I Room 102C</td>
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<td>Advanced Characterization and Imaging of Biomaterial Environments Room 101E</td>
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<td>Biomaterials for Immunomechanics II Room 102C</td>
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<td>Natural and Bioinspired Materials I Room 101E</td>
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<td>Drug Delivering Biomaterials I Room 200I</td>
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<td>BIOMECHANICS</td>
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<td>Concussion Biomechanics Auditorium 3</td>
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<td>Mechatrontransduction Auditorium 1</td>
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<td>Computational and Multiscale Modeling in Biomechanics II Room 200C</td>
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<td>Engineered Models of Glioma and the Tumor Microenvironment Room 101B</td>
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<td>Microscale Cancer Cell Analysis Auditorium 2</td>
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<td>Cancer Mechanobiology I Room 101B</td>
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<td>CARDIOVASCULAR ENGINEERING</td>
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<td>Cardiovascular Tissue Engineering III Room 102AB</td>
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<td>Heart Valve Structure, Function and Disease I Room 200J</td>
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<td>Gene Delivery and Genome Bioengineering Room 101A</td>
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<td>CMBE Young Innovators I Room 200F</td>
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<td>Topics in Drug Delivery I Room 200H</td>
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<td>Drug Delivery in Tissue Engineering and Medicine Room 200I</td>
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<td>3D Microfluidic Cancer Models Auditorium 2</td>
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<td>Microscale Cancer Cell Analysis Auditorium 2</td>
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<td>Micro/Nano Tools in Medicine</td>
<td>Meet the Expert: Meet the Journal Editors</td>
<td>Meet the Expert: Collaborations with Industry</td>
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<td>Meet the Expert: Collaborations for International Research</td>
<td>2:00 pm–5:00 pm</td>
<td>Educational Approaches to Best Prepare Students for Industry</td>
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<td>BMES-NSF Special Session on Research &amp; Grant Writing</td>
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<td>The 4th US-Korea Joint Workshop on Biomedical Engineering</td>
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<td>Joint AAA-BMES Symposium Genome Editing Strategies in Biomeengineering</td>
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<td>Integration of Biomaterials with Chips and Devices Auditorium 3</td>
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<td>Dynamic Biomaterials Hydrogel Biomaterials II Room 101E</td>
<td>Hydrogel Biomaterials III Room 102AB</td>
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<td>8:00 am-9:30 am</td>
<td>1:30 pm-3:00 pm</td>
<td>3:15 pm-4:45 pm</td>
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<tr>
<td>DEVICE TECHNOLOGIES AND BIOMEDICAL ROBOTICS</td>
<td>Medical Device Development and Computational Models Room 101D</td>
<td>Cancer Drug Delivery I Room 200G Targeted or Responsive Delivery Systems I Room 200C</td>
<td>Cancer Drug Delivery II Room 200G Targeted or Responsive Delivery Systems II Room 200C</td>
</tr>
<tr>
<td>DRUG DELIVERY</td>
<td>Cancer Drug Delivery Auditorium 2 Nano to Micro Devices in Drug Delivery Room 200C</td>
<td>Cancer Drug Delivery I Room 200G Targeted or Responsive Delivery Systems I Room 200C</td>
<td>Cancer Drug Delivery II Room 200G Targeted or Responsive Delivery Systems II Room 200C</td>
</tr>
<tr>
<td>NANO AND MICRO TECHNOLOGIES</td>
<td>Applications of Nanopores and Nanoparticles Room 200E</td>
<td>Advances in Pathogen Detection Room 200E</td>
<td>Advances in Micro/Nano Micro/Nano Manufacturing Room 200E</td>
</tr>
<tr>
<td>NEURAL ENGINEERING</td>
<td>Noninvasive Neuromodulation Room 200H</td>
<td>NeuroDevices/Neuromodulation Room 200H</td>
<td>Neural Invasive Devices/Interfaces: Compatibility, Stimulation, Recording and Modeling Room 200H</td>
</tr>
<tr>
<td>STEM CELL ENGINEERING</td>
<td>Pluripotent Stem Cell Engineering Room 200G</td>
<td>Stem Cells in Tissue Engineering Room 101C</td>
<td>Stem Cell Programming Auditorium 1</td>
</tr>
<tr>
<td>TISSUE ENGINEERING</td>
<td>Clinical Translation of Engineered Tissues Auditorium 3 Integration of Developmental Biology and Morphogenesis in Tissue Engineering Room 101C</td>
<td>Stem Cells in Tissue Engineering Room 101C</td>
<td>Inflammation and Immunomodulation Room 101C</td>
</tr>
<tr>
<td>TRANSLATIONAL BIOMEDICAL ENGINEERING</td>
<td>Clinical Translation of Engineered Tissues Auditorium 3</td>
<td>Undergraduate Research, Design &amp; Leadership I Room 200B</td>
<td>Undergraduate Research, Design &amp; Leadership II Room 200B</td>
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<tr>
<td>UNDERGRADUATE</td>
<td>Undergraduate Research, Design &amp; Leadership I Room 200B</td>
<td>Undergraduate Research, Design &amp; Leadership II Room 200B</td>
<td>Undergraduate Research, Design &amp; Leadership III Room 200B</td>
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<tr>
<td>OTHER</td>
<td>MEET THE EXPERT: Meet the Experts on Data-Sharing Room 204</td>
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## WEDNESDAY | OCTOBER 5, 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>12:00 noon – 7:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall BC/CC</td>
</tr>
<tr>
<td>8:30 am – 4:30 pm</td>
<td>BMES Board of Directors Meeting</td>
<td>Room 101H/CC</td>
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<tr>
<td>1:00 pm – 4:00 pm</td>
<td>AIMBE Board of Directors Meeting (affiliate event)</td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>2:30 pm – 5:30 pm</td>
<td>Biotechnology Company Tours (advance registration required)</td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>3:30 pm – 5:30 pm</td>
<td>Meet the Faculty Candidates</td>
<td>Exhibit Hall B/CC</td>
</tr>
<tr>
<td>4:00 pm – 5:00 pm</td>
<td>AIMBE Academic Council (affiliate event)</td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>5:00 pm – 7:00 pm</td>
<td>CMBE SIG Business Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>5:30 pm – 7:00 pm</td>
<td>Welcome Reception</td>
<td>Hall B Foyer/CC</td>
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<tr>
<td>7:30 pm – 8:30 pm</td>
<td>Industry Committee Planning Meeting (invitation only)</td>
<td>Boardroom 3/MH</td>
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<tr>
<td>6:30 pm – 10:30 pm</td>
<td>Council of Chairs Dinner &amp; Meeting (invitation only)</td>
<td>Salon E/MH</td>
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<tr>
<td>8:00 pm – 9:00 pm</td>
<td>LGBT Dessert Social (ticket purchase required)</td>
<td>Symphony III/MH</td>
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## THURSDAY | OCTOBER 6, 2016

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<tbody>
<tr>
<td>7:00 am – 6:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>7:00 am – 8:00 am</td>
<td>Diversity Committee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>PLATFORM SESSIONS – THURS-1 (19 concurrent sessions)</td>
<td>Convention Center</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>Becoming a Biomedical Engineer... What you need to know and where do you fit in</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>9:00 am – 10:00 am</td>
<td>INDUSTRY SESSION: Intellectual Property: Patent Process</td>
<td>Room 201/CC</td>
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<tr>
<td>9:15 am – 10:15 am</td>
<td>BME Careers in Academia</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>9:30 am – 10:30 am</td>
<td>Ethics Subcommittee Meeting</td>
<td>Room 101G/CC</td>
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<td>9:30 am – 5:00 pm</td>
<td>Exhibit Hall Open</td>
<td>Exhibit Hall BC/CC</td>
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<td>9:30 am – 5:00 pm</td>
<td>Career Zone</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>POSTER SESSION</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 10:15 am</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>10:15 am – 11:30 am</td>
<td>PLENARY SESSION &amp; STATE OF THE SOCIETY</td>
<td>Auditorium/CC</td>
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<tr>
<td>11:45 am – 12:45 pm</td>
<td>Celebration of Minorities in BME Luncheon (ticket purchase required)</td>
<td>Ballroom A/CC</td>
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<td>11:45 am – 12:45 pm</td>
<td>Lunch on Your Own</td>
<td>Exhibition Hall BC/CC</td>
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<tr>
<td>12:00 noon – 2:00 pm</td>
<td>INDUSTRY SESSION: Technology Transfer Titches and Networking</td>
<td>Room 201/CC</td>
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<td>1:00 pm – 2:30 pm</td>
<td>PLATFORM SESSIONS – THURS-2 (19 concurrent sessions)</td>
<td>Convention Center</td>
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<tr>
<td>1:00 pm – 2:30 pm</td>
<td>International Symposium on Biomedical Engineering</td>
<td>Room 208CD/CC</td>
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<tr>
<td>1:00 pm – 4:00 pm</td>
<td>Developing Best Practices for Graduate Training in Biomedical Innovation</td>
<td>Room 102E/CC</td>
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<tr>
<td>1:00 pm – 3:00 pm</td>
<td>50th Anniversary Committee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>1:30 pm – 2:45 pm</td>
<td>BME Careers in Industry</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>2:15 pm – 5:00 pm</td>
<td>INDUSTRY SESSION: Special Industry Topics</td>
<td>Room 201/CC</td>
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CC = Convention Center • MH = Minneapolis Hilton
## Thursday | October 6, 2016 (continued)

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<tr>
<td>2:30 pm – 3:15 pm</td>
<td>POSTER VIEWING WITH AUTHORS &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>2:45 pm – 4:15 pm</td>
<td>Rapid Resume Review <em>(BMES Members Only)</em></td>
<td>Room 208AB/CC</td>
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<tr>
<td>3:00 pm – 5:00 pm</td>
<td>Coop/Intern and Industrial Relations Workshop <em>(Invitation Only)</em></td>
<td>Room 102D/CC</td>
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<tr>
<td>3:15 pm – 4:30 pm</td>
<td>BME Government and Alternative Careers</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>3:15 pm – 4:45 pm</td>
<td><strong>PLATFORM SESSIONS – THURS-3</strong> <em>(19 concurrent sessions)</em></td>
<td>Convention Center</td>
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<tr>
<td>3:15 pm – 4:45 pm</td>
<td>Engineering Low-Cost Solutions to Address Health Care Disparities</td>
<td>Room 208CD/CC</td>
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<tr>
<td>4:30 pm – 5:15 pm</td>
<td>AEMB Annual Grand Meeting <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
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<tr>
<td>5:00 pm – 6:00 pm</td>
<td><strong>PLENARY SESSION:</strong> Pritzker Distinguished Lecture</td>
<td>Auditorium/CC</td>
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<tr>
<td>6:30 pm – 8:00 pm</td>
<td>AEMB Annual Reception <em>(affiliate event)</em></td>
<td>Lounge A/CC</td>
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<tr>
<td>7:00 pm – 9:00 pm</td>
<td>ACS Biomaterials Science &amp; Engineering Editorial Advisory Board Meeting <em>(affiliate event)</em></td>
<td>Room 102F/CC</td>
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<tr>
<td>8:00 pm – 9:30 pm</td>
<td>University Receptions <em>(Invitations Extended by Hosts)</em></td>
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## Friday | October 7, 2016

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<td>Registration</td>
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<td>7:00 am – 8:00 am</td>
<td>Education Committee Meeting</td>
<td>Room 101G/CC</td>
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<tr>
<td>8:00 am – 10:00 am</td>
<td>National Meetings Committee/2017 Annual Meeting Planning Committee</td>
<td>Room 101HI/CC</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td>International Affairs Subcommittee Meeting</td>
<td>Room 203A/CC</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td><strong>PLATFORM SESSIONS – FRI-1</strong> <em>(18 concurrent sessions)</em></td>
<td>Convention Center</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td><strong>WHITAKER SESSION</strong></td>
<td>Room 200J/CC</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>AAA-BMES Symposium: Genome Editing Strategies in Bioengineering</td>
<td>Room 208AB/CC</td>
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<tr>
<td>8:00 am – 9:00 am</td>
<td><strong>INDUSTRY SESSION:</strong> SBIR/STTR</td>
<td>Room 201/CC</td>
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<td>8:30 am – 9:30 am</td>
<td>BMES Student Chapter–Outstanding Chapter Best Practices</td>
<td>Room 208CD/CC</td>
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<tr>
<td>9:00 am – 10:30 am</td>
<td>Career Options for BME PhDs</td>
<td>Room 205ABCD/CC</td>
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<tr>
<td>9:00 am – 10:00 am</td>
<td>AEMB Ethics Session Meeting <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
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<td><strong>INDUSTRY SESSION:</strong> Reimbursement</td>
<td>Room 201/CC</td>
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<td>9:30 am – 10:30 am</td>
<td>BMES Student Chapter–Mentoring and Chapter–Industry Best Practices</td>
<td>Room 208CD/CC</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>Exhibit Hall Open</td>
<td>Convention Center</td>
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<tr>
<td>9:30 am – 5:00 pm</td>
<td>Career Zone</td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>9:30 am – 10:15 am</td>
<td><strong>POSTER SESSION</strong></td>
<td>Exhibit Hall BC/CC</td>
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<tr>
<td>10:15 am – 11:45 am</td>
<td><strong>PLENARY SESSION:</strong> NIBIB Lecture</td>
<td>DEBUT Awards Ceremony</td>
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<tr>
<td>12:00 noon – 1:30 pm</td>
<td>Lunch on Your Own</td>
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<tr>
<td>12:00 noon – 1:30 pm</td>
<td><strong>INDUSTRY SESSION:</strong> Healthcare Innovations with Physicians</td>
<td>Room 201/CC</td>
</tr>
<tr>
<td>12:00 noon – 1:30 pm</td>
<td>TAMU Luncheon–Excellence In Industry <em>(affiliate event)</em></td>
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**CC = Convention Center • MH = Minneapolis Hilton**

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<tr>
<th><strong>PLENARY SESSION</strong></th>
<th><strong>PLATFORM SESSION</strong></th>
<th><strong>POSTERS</strong></th>
<th><strong>SPECIAL SESSIONS</strong></th>
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<tr>
<td>STUDENT/EARLY CAREER</td>
<td>EXHIBITS</td>
<td>SPECIAL EVENTS</td>
<td>COMMITTEE MEETINGS</td>
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## Schedule At-A-Glance

### FRIDAY | OCTOBER 7, 2016 (continued)

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<th>Time</th>
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<td>12:00 noon – 1:30 pm</td>
<td>Women in BME Luncheon (ticket purchase required)</td>
<td>Ballroom A/CC</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td><strong>PLATFORM SESSIONS – FRI-2</strong> (19 concurrent sessions)</td>
<td>Convention Center</td>
</tr>
<tr>
<td>1:45 pm – 3:15 pm</td>
<td>BMES Undergraduate Student Design Competition</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>2:00 pm – 3:00 pm</td>
<td>Medical Devices SIG Business Meeting</td>
<td>Room 101HI/CC</td>
</tr>
<tr>
<td>2:00 pm – 5:00 pm</td>
<td>BMES-NSF Special Grant Writing Session</td>
<td>Room 102DEF/CC</td>
</tr>
<tr>
<td>2:00 pm – 3:00 pm</td>
<td><strong>INDUSTRY SESSION:</strong> Mobile/Digital Health</td>
<td>Room 201/CC</td>
</tr>
<tr>
<td>2:30 pm – 3:45 pm</td>
<td>BME Careers in Industry</td>
<td>Room 205ABCD/CC</td>
</tr>
<tr>
<td>3:15 pm – 4:00 pm</td>
<td><strong>POSTER VIEWING WITH AUTHORS</strong> &amp; Refreshment Break</td>
<td>Exhibit Hall BC/CC</td>
</tr>
<tr>
<td>3:15 pm – 6:15 pm</td>
<td>KOSOMBE - US-KOREA Joint Workshop on BME</td>
<td>Room 208AB/CC</td>
</tr>
<tr>
<td>3:15 pm – 5:15 pm</td>
<td><strong>INDUSTRY SESSION:</strong> Investment Pitches &amp; Partnering</td>
<td>Room 201/CC</td>
</tr>
<tr>
<td>3:30 pm – 4:30 pm</td>
<td>Membership Committee Meeting</td>
<td>Room 101G/CC</td>
</tr>
<tr>
<td>3:30 pm – 4:30 pm</td>
<td>Design Competition Judges Meeting</td>
<td>Room 203A/CC</td>
</tr>
<tr>
<td>4:00 pm – 5:30 pm</td>
<td>Educational Approaches to Best Prepare Students for Industry</td>
<td>Room 208CD/CC</td>
</tr>
<tr>
<td>4:00 pm – 5:30 pm</td>
<td><strong>PLATFORM SESSIONS – FRI-3</strong> (19 concurrent sessions)</td>
<td>Convention Center</td>
</tr>
<tr>
<td>4:15 pm – 5:30 pm</td>
<td>BME Entrepreneurs</td>
<td>Room 205ABCD/CC</td>
</tr>
<tr>
<td>5:45 pm – 6:30 pm</td>
<td><strong>PLENARY SESSION:</strong> Extraordinary Challenges and the Need for Extraordinary Competencies-The Role of the Biomedical Engineer</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>8:30 pm – 11:00 pm</td>
<td><strong>BMES DESSERT BASH</strong></td>
<td>Ballroom AB/CC</td>
</tr>
</tbody>
</table>

### SATURDAY | OCTOBER 8, 2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 am – 2:00 pm</td>
<td>Registration</td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>8:00 am – 9:00 am</td>
<td>Council of Industry Chapter Presidents <em>(invitation only)</em></td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>8:00 am – 9:30 am</td>
<td><strong>PLATFORM SESSIONS – SAT-1</strong> (18 concurrent sessions)</td>
<td>Convention Center</td>
</tr>
<tr>
<td>8:00 am – 9:30 am</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #1</td>
<td>Room 200B/CC</td>
</tr>
<tr>
<td>9:00 am – 10:00 am</td>
<td>AEMB MINDS Workshop <em>(affiliate event)</em></td>
<td>Room 200A/CC</td>
</tr>
<tr>
<td>9:30 am – 10:30 am</td>
<td>BMES Industry Advisory Board <em>(invitation only)</em></td>
<td>Room 101F/CC</td>
</tr>
<tr>
<td>9:30 am – 1:30 pm</td>
<td><strong>POSTER SESSION</strong></td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>9:30 am – 1:00 pm</td>
<td><strong>POSTER VIEWING WITH AUTHORS</strong> &amp; Refreshment Break</td>
<td>Exhibit Hall/CC</td>
</tr>
<tr>
<td>9:30 am – 10:15 am</td>
<td>Student Affairs Subcommittee Meeting</td>
<td>Room 203A/CC</td>
</tr>
<tr>
<td>9:30 am – 12:30 pm</td>
<td><strong>PLENARY SESSION:</strong> Rita Schaffer Young Investigator Lecture &amp; Diversity Award Winner</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>10:30 am – 12:30 pm</td>
<td><strong>PLENARY SESSION:</strong> Special Event</td>
<td>Auditorium/CC</td>
</tr>
<tr>
<td>12:30 pm – 1:30 pm</td>
<td>Lunch on Your Own</td>
<td>Room 101HI/CC</td>
</tr>
<tr>
<td>1:00 pm – 3:30 pm</td>
<td>BMES Board of Directors Meeting</td>
<td>Room 101HI/CC</td>
</tr>
<tr>
<td>1:30 pm – 3:00 pm</td>
<td><strong>PLATFORM SESSIONS – SAT-2</strong> (17 concurrent sessions)</td>
<td>Convention Center</td>
</tr>
<tr>
<td>1:30 pm – 3:00 pm</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #2</td>
<td>Room 200B/CC</td>
</tr>
<tr>
<td>3:15 pm – 4:45 pm</td>
<td><strong>PLATFORM SESSIONS – SAT-3</strong> (17 concurrent sessions)</td>
<td>Convention Center</td>
</tr>
<tr>
<td>3:15 pm – 4:45 pm</td>
<td>Undergraduate Research, Design &amp; Leadership Orals #3</td>
<td>Room 200B/CC</td>
</tr>
</tbody>
</table>

**CC** = Convention Center • **MH** = Minneapolis Hilton
2016 BMES Annual Meeting

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8201 CORPORATE DRIVE
SUITE 1125
LANDOVER, MD 20785-2224
phone | 301-459-1999
fax | 301-459-2444
www.bmes.org